FROM LOCKDOWN TO INFLATION

A STUDY OF UK PRIVATE EQUITY PORTFOLIO COMPANIES THROUGH TURBULENT TIMES

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Abstract

Using a sample of 191 UK companies that were private equity-backed throughout 2019-2022, we investigate the impact of PE ownership on firms during and after the COVID-19 pandemic. We find that PE-backed firms exhibited a significant increase in leverage ratios relative to industry peers during the pandemic, with this differential growing post-pandemic. Nevertheless, PE-backed firms did not experience a relative increase in borrowing costs and showed a modest rise in equity injections, which persisted post-pandemic. We observe that PE portfolio companies underperformed their peers in operating metrics during the pandemic, particularly in profitability measures, indicating challenges with cost cutting. In the post-pandemic period, PE-backed firms exhibited a relative recovery in operating performance. Notably, companies exited in 2021-2022 significantly outperformed those retained in PE portfolios during the pandemic. Our results indicate that PE firms act opportunistically with regard to exit timing, reacting to market conditions and firm-specific performance. These findings contribute to the understanding of PE behavior during and after economic crises.

Keywords: Private equity, COVID-19 pandemic, financing decisions, operating performance, exit timing

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Table of contents

1 INTRODUCTION 1

2 BACKGROUND INFORMATION 4

2.1 PRIVATE EQUITY 4
2.2 ECONOMIC IMPACT OF THE COVID-19 PANDEMIC 5
2.3 POST-PANDEMIC ECONOMIC SITUATION 5

3 LITERATURE REVIEW 6

3.1 OPERATING PERFORMANCE AND VALUE CREATION IN PRIVATE EQUITY 6
3.2 PRIVATE EQUITY IN THE GLOBAL FINANCIAL CRISIS AND COVID-19 PANDEMIC 8

4 HYPOTHESES DEVELOPMENT 11

4.1 FINANCING METRICS 11
4.1.1 Total debt, debt issuance, and leverage 11
4.1.2 Cost of debt 12
4.1.3 Equity injections 13
4.2 OPERATING PERFORMANCE METRICS 14

5 DATA AND DESCRIPTIVE STATISTICS 16

5.1 TREATMENT GROUP SETUP 16
5.2 CONTROL GROUP SETUP 17
5.3 DATA SUMMARY AND CONSTRUCTED VARIABLES 18

6 METHODOLOGY 22

6.1 STANDARD DIFFERENCE-IN-DIFFERENCES MODEL 22
6.2 PARALLEL TRENDS ASSUMPTION VALIDATION 23
6.3 DYNAMIC SPECIFICATION OF THE DID MODEL AND YEAR-BY-YEAR EFFECTS 26

7 RESULTS AND ANALYSIS 27

7.1 FINANCING METRICS 27
7.1.1 Debt financing and leverage 27
7.1.2 Cost of debt 32
7.1.3 Equity injections 34
7.2 PROFITABILITY 35
7.2.1 Profitability results 35
7.2.2 Profitability analysis 40
7.3 SENSITIVITY OF PE PORTFOLIO COMPANY PERFORMANCE TO SAMPLE DESIGN 40
7.3.1 Data, descriptive statistics, and methodology 41
7.3.2 Results and analysis 41
7.4 PERFORMANCE HETEROGENEITY BASED ON EXIT TIMING 44
7.4.1 Data, descriptive statistics, and methodology 44
7.4.2 Results and analysis 46
7.5 ROBUSTNESS CHECK 49
7.6 LIMITATIONS 50

8 CONCLUSION 51

REFERENCES **53**
PAPERS AND BOOKS **53**
REPORTS **56**
ONLINE RESOURCES **56**
APPENDIX **57**

List of abbreviations

CEO	Chief Executive Officer
COVID-19	Coronavirus Disease 2019
DiD	Difference-in-Differences
EBIT	Earnings Before Interest and Taxes
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortization
EUR	Euro
FE	Fixed Effects
GDP	Gross Domestic Product
GFC	Global Financial Crisis
GP	General Partner
LBO	Leveraged Buyout
LP	Limited Partner
N	Number of Observations
NACE	Nomenclature Statistique des Activités économiques dans la Communaute Europeenne (Statistical classification of economic activities in the European Community)
PE	Private Equity
Q	Quarter
ROA	Return on Assets
SD	Standard Deviation
UK	United Kingdom
U.S.	United States
vs	Versus
£	Pound Sterling
$	United States Dollar

1 Introduction

Over the past few decades, private equity (PE) has emerged as an important force in corporate ownership, attracting growing interest from both investors and researchers. A key area of this research has examined how PE-backed firms perform relative to similar non-PE-backed firms. Several studies, such as Kaplan (1989), Boucly et al. (2011), and Acharya et al. (2013), studying PE activity across different markets and time periods, generally support that private equity ownership can create value and generate operational improvements. A critical question, however, is whether these advantages also persist during periods of economic crisis. The COVID-19 pandemic of 2020 and 2021, with its severe economic and societal impact, provides an opportunity to test the persistence of these benefits. Moreover, the post-pandemic period, characterized by continued supply chain disruptions, rising inflation, and interest rate hikes, presented additional challenges.

The purpose of this thesis is to examine the performance of PE-backed firms in the United Kingdom (UK) during the COVID-19 crisis (2020-2021) and the post-pandemic period (2022-2023), compared to similar non-PE-backed firms. Specifically, we investigate financing decisions and operational performance across these two time periods. Furthermore, we explore heterogeneity within the group of PE-backed firms by analyzing whether companies that were exited during or shortly after the pandemic outperformed those that remained under PE ownership. By addressing these questions, we aim to improve the understanding of the performance of PE-backed firms during and after the pandemic and to shed light on the relationship between firm performance during the crisis and subsequent exit decisions.

Recent research has begun to explore the impact of the COVID-19 pandemic on PE portfolio companies. Lavery and Wilson (2024) find that UK PE-backed firms exhibited a slight but statistically significant operating outperformance relative to their industry peers during the pandemic. However, existing studies have primarily focused on the immediate pandemic period and have not addressed firm performance during and after the pandemic in a combined study. Furthermore, to the best of our knowledge, no prior research has examined the relationship between firm performance during the pandemic and subsequent exit decisions for PE-backed companies. This thesis aims to address these gaps by investigating both the pandemic and post-pandemic periods and by linking performance during the crisis to exit decisions by PE sponsors.

To conduct our empirical investigation, we construct a treatment sample consisting of UK companies that were PE-owned for at least one year before and one year after the pandemic,

meaning that they were under PE ownership throughout 2019-2022. We use a Difference-in-Differences (DiD) model to test the performance of PE-backed firms relative to a control group of similar non-PE-backed firms. To construct the control group, we employ a matching procedure similar to that used by Boucly et al. (2011) and Bernstein et al. (2019), selecting non-PE-backed firms based on industry and pre-pandemic characteristics, including size, leverage, and profitability. This ensures that the two groups share similar pre-pandemic characteristics and trends, a crucial requirement for the validity of the DiD approach.

Our results reveal that, from a financing perspective, PE-backed firms leveraged their access to debt financing. During the pandemic, PE-backed firms increased their total debt by 36.8% and their leverage ratios by 4 percentage points more than control firms, after accounting for pre-pandemic differences between both groups. This development strengthened in the post-pandemic period, with leverage ratios and debt levels increasing even further. Despite this, PE-backed companies did not experience a significant relative increase in cost of debt during and after the pandemic. We also document a modest and slightly statistically significant increase in equity injections for PE-backed firms, particularly in the post-pandemic period, suggesting that support by PE firms for their portfolio companies continued as monetary policy tightened. Our analysis of operating performance metrics shows that PE-backed firms underperformed their industry peers during the pandemic. While we observe a slight and statistically insignificant underperformance in revenue, the underperformance is more pronounced for EBIT and return on assets (ROA), suggesting that PE-backed firms faced greater challenges with cost-cutting during the pandemic. In our subsequent analysis, we evaluate different explanations and find support for the hypothesis that these firms operate with higher fixed costs relative to variable costs (higher operating leverage), reducing their ability to adjust costs proportionally during revenue shocks. In the post-pandemic period, PE-backed firms showed a relative recovery, performing better than their industry peers when compared to the pandemic period. However, this relative improvement was not strong enough to offset the pandemic underperformance and reach the level of statistically significant outperformance, relative to pre-pandemic levels.

To assess whether our results are dependent on sample selection criteria, we modify our sample to include deals from 2019 and firms exited in 2021 and 2022, replicating the approach of Lavery and Wilson (2024). The apparent underperformance largely disappears. This observation leads us to investigate whether firms exited in 2021 and 2022 are associated with better operating performance during the pandemic. Our results are striking: PE-backed firms exited in 2021-2022 significantly outperformed their later-exited or not-exited counterparts

during the pandemic, with revenue and EBIT 19.6% and 32.5% higher, respectively. This suggests that PE firms divested more resilient and better-performing portfolio companies in 2021-2022, while retaining underperformers for further operational improvements.

The remainder of this thesis is structured as follows. Section 2 provides an overview of relevant background information, including an introductory text to private equity and a description of the economic environment during the pandemic and in its aftermath. Section 3 presents a literature review, with a focus on value-creation mechanisms in PE portfolio companies and operating performance of PE-backed firms during economic crises. In Section 4 we construct our hypotheses. Section 5 presents the data sources, variable construction, and matching methodology used to build the treatment and control groups, while Section 6 outlines the empirical strategy. Section 7 discusses and analyses the main results, and Section 8 is dedicated to our conclusion. Additional tables, figures, robustness checks, and a formula overview are provided in the Appendix.

2 Background information

2.1 Private equity

Private equity is a form of corporate ownership where a specialized investment firm, the PE firm, acquires companies with the intent to add value and later sell them at a profit (Ljungqvist, 2024). PE firms search for acquisition targets and acquire them using a significant amount of debt and a smaller part of equity, in what is known as a leveraged buyout (LBO) (Kaplan and Strömberg, 2009). To finance the equity portion of LBOs, PE firms raise capital through private equity funds, which are typically structured as limited partnerships (Axelson et al., 2009). In this setup, two parties are involved. The PE firm itself serves as the general partner (GP), whose main responsibilities are to manage the fund and execute investments (Ljungqvist, 2024). The limited partners (LPs) are typically institutional investors such as university endowment funds. They contribute the majority of the capital but have little to no involvement in the fund's operations (Kaplan and Strömberg, 2009). The typical fund lifetime is 10-13 years during which capital cannot be withdrawn (Ang and Sorensen, 2012).

Regarding compensation, GPs earn a fixed annual management fee, typically 2% of committed capital, and a variable component, called the carried interest, usually 20% of profits. The carried interest, however, is only paid after GPs return all invested capital to LPs plus a minimum "hurdle rate" (Robinson and Sensoy, 2013). While the management fee is an important part of GPs' compensation (Metrick and Yasuda, 2010), the setup with the carried interest is important to align incentives between GPs and LPs (Gilligan and Wright, 2020). Beyond the direct compensation through carried interest, a fund's current performance is also important for GPs as it affects their prospects to raise capital for subsequent funds (Chung et al., 2012).

In their pursuit of financial returns, private equity firms actively engage with their portfolio companies to drive value creation (Ljungqvist, 2024). According to Kaplan and Strömberg (2009), these actions typically fall into three categories: operational, financial, and governance engineering. In the 1980s, governance and financial engineering were common concepts. Only later, operational engineering, which refers to adding value to portfolio companies through providing industry and operating expertise, emerged (Kaplan and Strömberg (2009). Therefore, large PE firms recruit experienced operating professionals and set up value-creation teams with significant experience to drive operational improvements and support portfolio company growth (Kaplan and Strömberg, 2009).

2.2 Economic impact of the COVID-19 pandemic

The COVID-19 pandemic created not only a public health crisis but also a profound disruption of the global economy. As populations were subject to restrictions through social distancing measures, production and sale activities were constrained, and consumer demand plummeted (Fahlenbrach et al., 2021). While the pandemic impacts were not symmetric across all regions, the effects were particularly acute in advanced economies, including the United Kingdom (World Bank, 2020). While global GDP per capita contracted by 3.9% in 2020, the UK experienced a more significant decline of 10.6% (World Bank, 2020). In response, the Bank of England followed an expansionary monetary policy, decreasing its main interest rate from 0.75% to 0.1% in March 2020 and extending its lending operations to support companies (Fischer, 2021). Overall, the economic recovery was slow: by Q4 of 2022, UK GDP had only just returned to its pre-pandemic level (Harari et al., 2022). And, as the health crisis began to fade, a new macroeconomic challenge emerged: inflation.

2.3 Post-pandemic economic situation

As mass vaccination campaigns progressed across the Western world in the second half of 2021, most governments began lifting pandemic restrictions. During the pandemic, household savings reached record levels, particularly in the UK, where the household saving ratio in 2020 and 2021 was the highest in the 21st century (UK's Office for National Statistics, 2021). As normalcy returned, this accumulation of savings fuelled a boost in demand. Supply chain disruptions in Europe, which emerged during the pandemic, continued to be an issue post-pandemic (World Economic Forum, 2022). Further, the Russia-Ukraine war intensified inflationary pressures (PitchBook, 2023), with energy and food prices significantly impacted. Annual inflation in the UK peaked at 9.1% in 2022 and remained elevated at 7.3% in 2023 (UK's Office for National Statistics, 2023). The Bank of England (2023) reacted by raising its main interest rate from 0.1% in December 2021 to 5.25% by August 2023.

Overall, the post-pandemic period proved particularly challenging for UK companies, which faced continued supply chain disruptions, increased input costs, and a tight interest rate environment. Moreover, the post-pandemic period also posed challenges for the PE industry due to the elevated borrowing costs and lowered valuations of existing portfolio companies (PitchBook, 2023). As a result, PE deal and exit activity were negatively impacted, with deal value in Europe falling in 2022 and 2023 from its record high in 2021 (PitchBook, 2024).

3 Literature review

3.1 Operating performance and value creation in private equity

This section presents key contributions to literature examining whether, and how, PE buyouts create value for the firms they acquire. We begin with Jensen's (1989) theory and then turn to subsequent empirical studies. Specifically, this section focuses on research that investigates the operating performance of PE-backed companies following a buyout and explores various value-creation channels.

A foundational theory is provided by Jensen (1989), who argues that PE represents a superior form of ownership structure compared to publicly listed companies. He identifies key channels through which value can be created: high financial leverage which imposes financial discipline on managers; stronger alignment of incentives between management and investors through equity ownership by managers and performance-based compensation; and implementation of stronger governance structures with increased board oversight.

Empirical evidence from over the past decades generally supports the hypothesis that PE ownership is associated with improvements in operating performance (e.g., Kaplan, 1989; Opler, 1992; Guo et al., 2011; Boucly et al., 2011; Acharya et al., 2013; Biesinger et al., 2020; Cohn et al., 2022).

Kaplan (1989) conducted one of the earliest empirical studies on private equity returns. By studying 48 management buyouts in the United States between 1980 and 1986, he finds significant improvements in operating income and net cash flow following the buyout. Kaplan attributes these improvements to better management incentives and less to wealth transfers. By studying 44 going-private transactions completed between 1985 and 1989, Opler (1992) finds that the target firms experience increases in both operating profits and sales, as well as a significant rise in operating profit per employee. Guo et al. (2011) analyze 94 U.S. public-to-private transactions, with a deal value of at least $100 million and completion between 1990 and 2006. They find that gains in operating performance for PE-backed firms are comparable to or slightly higher than those of similar non-buyout firms. Notably, cash flow gains are greater for target companies with higher pre-buyout leverage, with greater increases in debt due to the deal, and for firms where the PE sponsor replaces the CEO during or shortly after the buyout. Boucly et al. (2011) examine 839 French LBOs conducted between 1994 and 2004. They find that, in the three years post-buyout, target firms become more profitable and grow faster than control firms in terms of sales, assets, and employment and increase debt levels to finance asset growth. Moreover, based on their analysis of the U.S. PE-buyouts conducted between 1980

and 2013 compared to similar non-PE-backed firms, Davis et al. (2025) show that the target experiences a significant improvement in productivity, particularly when the buyout was completed in times of recession or tight credit conditions. However, the effects on employment vary: in the two years after the buyout, employment at formerly publicly listed firms decreases by 12% but rises by 15% at formerly private firms compared to similar unsponsored firms.

In addition to the findings on improvements in operating performance post-buyout, recent research has identified additional channels of value creation under PE ownership, such as the relaxation of financing constraints (Amess et al., 2016; Cohn et al., 2022; Boucly et al., 2011; Fracassi et al., 2022). Other value-creation mechanisms include better financing terms (Ivashina and Kovner, 2011) and often higher management quality (Bloom et al., 2015). In addition, PE activity can have positive spillover effects on broader industry activity (Bernstein et al., 2017). In the following, we will explore these mechanisms in greater detail.

Cohn et al. (2022), in their analysis of 288 PE-backed firms in the U.S. acquired between 1995 and 2009, identify the relaxation of credit constraints as a key driver of value creation for private buyouts. They note that privately held firms usually rely on debt financing to fund growth but often face limited access to capital markets. Importantly, these private firms are already highly leveraged pre-buyout, making access to additional debt difficult. Buyouts by PE sponsors help to relax these credit constraints and thereby allow firms to pursue growth opportunities. Similarly, Boucly et al. (2011) show that sales, assets, and debt mainly increase in private-to-private buyouts, while public-to-private buyouts show an increase in profitability but not in growth. In addition, the study reveals that the increase in firm size, debt, and capital expenditures after a buyout is greater for firms operating in industries that rely more on external financing. Boucly et al. (2011) attribute their findings to differences in access to capital markets. While public companies often have better access to funding, private firms are often more credit-constrained. In addition, in their analysis of 407 UK buyouts, Amess et al. (2016) find that LBOs have a positive impact on innovation output. This effect is driven by private-to-private transactions and firms and industries more likely to be financially constrained, where PE firms can alleviate financial constraints. Cohn et al. (2022), Boucly et al. (2011), and Amess et al. (2016) thus make an important contribution by identifying improved access to capital as a key source of value creation in PE buyouts.

In addition, Ivashina and Kovner (2011) examine how relationships between PE sponsors and banks influence the loan terms of the portfolio companies. Analyzing 1,590 loans used to finance PE buyouts between 1993 and 2005, they find that strong relationships between sponsors and banks are associated with better loan terms for portfolio companies. The authors

argue that repeated interactions with the same LBO firm give banks greater confidence in the sponsor's due diligence and monitoring capabilities. In addition, banks are motivated to maintain good relationships with PE sponsors due to the potential for cross-selling opportunities. Ivashina and Kovner (2011) thereby add to the literature by identifying sponsor-lender relationships as an additional mechanism through which PE ownership creates value by improving access to favorable financing.

By studying the relationship between PE ownership and management quality across firms in 34 countries, Bloom et al. (2015) show that PE-owned companies are generally well managed, often significantly better than firms owned by founders or governments, or firms which are run by the owner family. Only publicly listed firms with dispersed shareholders and family firms run by external CEOs have similar high management scores. Moreover, they find that PE ownership is linked with stronger monitoring and improved operational practices.

Bernstein et al. (2017) analyze the wider economic impact of private equity buyouts and thereby add to the existing literature, which is rather focused on firm-level studies. The authors find that industries with higher PE activity over the previous five years experience faster growth in production, employment, and capital formation. Moreover, these positive effects extend beyond PE-backed firms. The authors suggest that spillover effects can explain at least partially this observation. The findings of Bernstein et al. (2017) highlight that PE can contribute to a broader economic growth.

3.2 Private equity in the Global Financial Crisis and COVID-19 pandemic

This section examines critical literature on private equity during economic disruptions, relating to the GFC and the COVID-19 pandemic. We thereby focus on studies by Bernstein et al. (2019), Lavery and Wilson (2024), and Gompers et al. (2022).

In their analysis of 434 PE-backed companies in the UK during the GFC, Bernstein et al. (2019) conclude that these firms were not more vulnerable to the onset of the GFC than their non-PE-backed peers. While both groups experienced decreasing debt issuance, the decline was approximately 4 percentage points smaller for PE-backed firms. Further, PE portfolio companies exhibited a relative increase in equity injections from investors. The authors' survey among PE firms reveals that access to lenders facilitated by sponsors was critical for portfolio companies during the crisis, supporting Ivashina and Kovner's (2011) findings. These advantages in financing enabled a relative increase in investments, which also drove an increase in asset growth relative to peers and higher market shares for the portfolio companies. Notably, these firms did not experience operational underperformance compared to their counterparts

throughout the crisis. Overall, Bernstein et al. (2019) demonstrate that PE-backed firms exhibited greater resilience to the crisis and did not increase the economic fragility during the GFC.

Lavery and Wilson (2024) study the performance of UK PE-backed companies during the COVID-19 pandemic, finding that these firms, on average, demonstrated greater resilience than their industry peers. The authors show that the PE-backed firms exhibited a slight operating outperformance in terms of revenue and EBITDA, driven by companies that had experienced stronger pre-pandemic performance and maintained greater financial flexibility. Nevertheless, the outperformance differential for PE-backed companies was smaller than in the pre-pandemic period. Overall, the pandemic-related findings of Lavery and Wilson (2024) differ from the GFC-related findings of Bernstein et al. (2019). The authors highlight fundamental differences between the crises: while the GFC primarily presented a credit market freeze, the COVID-19 crisis involved lockdowns and social distancing measures and led to limited consumption and production. Lavery and Wilson (2024) conclude that PE investors were better at securing necessary funding during the GFC than at mitigating the economic impact of the pandemic restrictions on their most vulnerable firms. The authors argue that the PE outperformance during COVID-19 was the result of better target selection ex-ante rather than active crisis support.

In July 2020, Gompers et al. (2022) conducted a survey of PE managers to assess their responses to the COVID-19 pandemic. The survey provides insights from over 200 PE managers, who, at the time, oversaw about $1.9 trillion in assets under management. Following the pandemic outbreak, these managers prioritized support of portfolio companies. To enhance liquidity, PE firms prioritized debt financing, specifically drawing down on revolving credit lines of portfolio companies. Additional equity injections were less prioritized and commonly considered only for the more severely impacted portfolio companies. If equity injections were considered, then PE firms preferred capital sourced from the original fund rather than external investors or subsequent funds. Further, more than two-thirds of the surveyed managers increased their investment horizons in response to market conditions. Nevertheless, the managers were still considering exit options for portfolio companies, with strategic sales the most favoured one. Regarding operational strategies, the managers emphasized revenue growth as their primary channel to create value rather than cost-cutting. The survey also revealed that PE managers considered about 40% of their companies moderately affected by the pandemic, while only 10% were severely impacted. Despite the challenges of the pandemic, PE managers

remained optimistic, with 91% expecting their funds to outperform public markets and 35% anticipating a significant outperformance.

Hence, these studies make an important contribution to private equity literature by improving our understanding of PE resilience during economic crises and by providing insights into crisis management of PE firm managers.

4 Hypotheses development

4.1 Financing metrics

The COVID-19 pandemic triggered a combination of both demand and supply shocks (Hassan et al., 2023). Social distancing measures disrupted production, while consumer demand fell across many sectors. These disruptions resulted in revenue declines and liquidity shortages across industries (Fahlenbrach et al., 2021). Gompers et al. (2022) find that PE sponsors considered different financial measures to strengthen the liquidity position of their portfolio companies, with the extent depending on the severity of the pandemic's impact on each firm. The following three subsections will develop hypotheses regarding financing decisions during both the pandemic and post-pandemic period.

4.1.1 Total debt, debt issuance, and leverage

One key measure PE sponsors may use to enhance liquidity of their portfolio companies is debt issuance. Gompers et al. (2022) report that many sponsors aimed to resolve liquidity shortages by increasing debt levels. Unlike during the GFC, credit markets remained functional throughout the pandemic. Consequently, we do not expect to observe a decline in debt issuance similar to that documented by Bernstein et al. (2019) during the GFC.

Prior research highlights the improved access to debt financing as a key channel of value creation in PE buyouts (Cohn et al., 2022; Boucly et al., 2011; Fracassi et al., 2022; Amess et al., 2016). The close relationship between PE sponsors and lenders can lead to a greater willingness by banks to provide credit to portfolio companies (Ivashina and Kovner, 2011), potentially easing debt financing during economic crises (Bernstein et al., 2019). We therefore expect that PE sponsors and portfolio companies used these relationships during the pandemic crisis to support liquidity through additional borrowing. Based on this reasoning, we expect a relative increase in debt issuance for PE-backed companies.

As revenues recovered and liquidity pressures declined post-pandemic, a key reason for raising debt during the pandemic diminished. Hence, the need for additional debt financing decreased, and the benefits of PE-backing as a means to facilitate access to debt may have become less pronounced. Further, the post-pandemic period was characterized by a change in monetary policy as interest rates rose significantly. The Bank of England progressively raised its main interest rate from 0.1% in December 2021 to 5.25% by August 2023 (Bank of England, 2023), decreasing the attractiveness of debt financing. For these reasons, we expect differences in debt growth between PE-backed and non-PE-backed firms to return to pre-pandemic levels.

Nevertheless, we anticipate debt levels to remain elevated, as we suppose that PE firms have prioritized using available cash for post-pandemic growth opportunities and as a cash buffer rather than for deleveraging.

Based on the above discussion, we establish the following hypotheses:

Hypothesis 1A: *During the pandemic (2020-2021), PE-backed firms experience a relative increase in debt issuance compared to industry peers, leading also to a relative increase in total debt for the portfolio companies.*

Hypothesis 1B: *In the post-pandemic period (2022-2023), the relative increase in debt issuance by PE-backed firms does not persist. However, these firms do not deleverage and maintain higher overall debt levels compared to industry peers.*

4.1.2 Cost of debt

Established relationships between PE firms and lenders can reduce information asymmetries and increase trust between the two parties, potentially leading to more favorable loan terms, such as lower interest rates and looser covenants (Ivashina and Kovner, 2011). These relationships may benefit PE-backed firms not only in terms of securing additional debt financing during periods of crises but also in achieving more attractive borrowing conditions. Accordingly, we expect to observe a relative decline in borrowing costs, measured by the cost of debt, for PE-backed firms compared to their industry peers during the pandemic period (2020-2021).

In the post-pandemic period (2022-2023), as we expect the relative increase in debt issuance for PE-backed firms to reverse, the benefits of the relationships between sponsors and lenders may have become less pronounced. However, we suppose that PE-backed firms likely continued to benefit from the more favorable loan terms locked in during the pandemic. Thus, we anticipate the relative decrease in cost of debt for PE-backed firms not to intensify but rather to persist.

In light of these arguments, we put forward the following hypotheses:

Hypothesis 2A: *During the COVID-19 pandemic (2020-2021), PE-backed firms experience a relative decrease in cost of debt compared to non-PE-backed firms.*

Hypothesis 2B: *In the post-pandemic period (2022-2023), the relative decrease in borrowing costs for PE-backed firms persists but does not continue to intensify.*

4.1.3 Equity injections

Along similar lines, we also examine equity injections received by portfolio companies during and after the pandemic. We therefore outline the following criteria on which our hypotheses rest.

First, the economics of PE fund structures provide strong incentives for general partners to protect investments through equity injections to avoid bankruptcies. In the typical compensation structure, GPs earn a 2% management fee and a 20% carried interest, with the carried interest typically paid only if all invested capital is returned to LPs plus a preferred return ("hurdle rate") (Robinson and Sensoy, 2013). This setup incentivizes GPs to protect investments through equity injections, as preventing total losses increases the likelihood of earning the carried interest. In addition, the current fund's performance and a PE firm's track record affect the GP's prospects to raise capital for subsequent funds (Kaplan and Schoar, 2005; Chung et al., 2012), providing another strong incentive for PE firms to avoid portfolio company failures and protect investments through equity injections. These incentives help explain the findings of Hotchkiss et al. (2021) that PE-backed firms tend to restructure more rapidly and are less likely to be liquidated compared to non-PE-backed firms. Second, PE firms possessed substantial amounts of uninvested capital, with EUR 294 billion of "dry powder" in 2020 alone in Europe (PitchBook, 2021). This capital positioned GPs with significant financial resources to support portfolio companies. Third, relative to unsponsored companies, equity injections may also be more feasible due to lower frictions between the sponsor and the company. The close monitoring and control that PE firms have over their portfolio companies reduces information asymmetries and decreases the risk that managers extract private benefits at the expense of firm performance (Bernstein et al., 2019). Piecing these arguments together, we expect a relative increase in equity injections for PE-backed companies compared to industry peers during the pandemic period.

In the post-pandemic period, as revenues of many companies recovered, the need for liquidity support decreased. Consequently, we expect the relative increase in equity injections to moderate rather than intensify. Nevertheless, several post-pandemic developments may have resulted in the differential in equity injections between PE-backed and non-PE-backed companies to remain above pre-pandemic levels. First, supply chain disruptions may have put continued pressure on working capital at some portfolio companies, potentially leading PE firms to provide additional equity injections to the affected ones. Second, interest rate hikes, as seen in the UK, made debt financing more costly, increasing the attractiveness of equity as a

funding choice. For these reasons, we anticipate that, on average, the difference in equity injections between PE-backed firms and their industry peers remains above pre-pandemic levels.

Considering this discussion, we stipulate the following hypotheses:

Hypothesis 3A: *During the pandemic (2020-2021), PE-backed firms experience a relative increase in equity injections compared to industry peers.*

Hypothesis 3B: *In the post-pandemic period (2022-2023), the differential in equity injections between PE-backed companies and their industry peers narrows compared to the pandemic period while remaining above pre-pandemic levels.*

4.2 Operating performance metrics

In this section, we outline different operational and governance criteria on which our hypotheses on operating performance rest:

First, many PE firms employ experienced operating professionals and value-creation teams with significant expertise (Kaplan and Strömberg, 2009). We anticipate that this knowledge and support can be quickly provided to portfolio companies and can enhance operating performance of PE-backed firms during crises. Moreover, PE ownership is associated with better monitoring and stronger governance structures (Kaplan and Strömberg, 2009). These characteristics may allow faster decision-making, which can be particularly valuable during crises. Further, portfolio companies often tend to be better managed than comparable non-PE-backed firms (Bloom et al., 2015), potentially contributing to an outperformance during the pandemic. Based on these operational and governance advantages, we hypothesize that PE-backed firms exhibit a relative improvement in operating performance compared to non-PE-owned firms during the pandemic.

In the post-pandemic period, PE-backed firms were likely in a better position to take advantage of growth opportunities due to their stronger financial opportunities and sponsor support. This relative advantage may have enabled PE-backed firms to act more quickly in the post-pandemic period, increase market share, and pursue add-on acquisitions. In the UK, the post-pandemic period was characterized by challenges such as continued supply chain disruptions and inflation increasing from 2.6% in 2021 to 9.1% in 2022 (UK's Office for National Statistics, 2023). The support through operational teams of PE firms and the better monitoring may have allowed portfolio companies to react more effectively to these challenges.

For these reasons, we expect the relative improvement of operating performance of PE-backed firms not only to persist but also to intensify post-pandemic.

Based on these arguments, we formulate the following hypotheses:

Hypothesis 4A: *During the pandemic period (2020-2021), the operating performance of PE-backed firms is less severely affected than that of industry peers, resulting in a relative improvement in operating performance metrics, such as revenue and EBIT.*

Hypothesis 4B: *In the post-pandemic period (2022-2023), PE-backed firms recover better and navigate macroeconomic challenges more successfully than industry peers, leading to a continued relative improvement in operating performance metrics.*

5 Data and descriptive statistics

This section begins by outlining the process used to construct our sample. We then describe in detail the criteria that companies in both the treatment and control groups must meet, and subsequently present descriptive statistics of our dataset.

5.1 Treatment group setup

To construct our dataset of private equity-backed companies, we begin by identifying all buyout transactions between 2013 and 2018 in which the target company is headquartered in the United Kingdom. Therefore, we utilize PitchBook, a widely used data source in previous literature on private equity[1], and search for deal types classified as "Buyout/LBO". Similar to Lavery and Wilson (2024), we exclude transactions labeled as "Add-on" acquisitions. Our initial download yields 2,263 transactions with a deal status of "Completed" and at least one identified investor. Subsequently, we omit 297 transactions labeled as "Asset Acquisitions" from our sample, and following the approach of Lavery and Wilson (2024), we exclude venture capital-backed deals and follow-on rounds for the same portfolio company. In cases where a company underwent multiple buyout deals between 2013 and 2018, we retain only the most recent deal, resulting in the exclusion of an additional 169 transactions.

In the next step, we identify how and, importantly, when a private equity investor exited a deal. Using the same PitchBook database, we search for transactions that we consider an exit, categorized by the following deal types: (1) initial public offering, (2) secondary buyout, (3) merger and acquisition, (4) sale to management, and (5) bankruptcy. In some instances, we perform manual searches of financial news involving the target firm and of press releases by investors. Our dataset retains only those companies that either (a) were exited in 2023 or later, or (b) have not yet been exited. This criterion ensures that each company in our sample remained under private equity ownership for at least one year, both before and after the COVID-19 pandemic. Following this selection process, we obtain a sample of 812 companies.

We further refine our sample by removing 16 non-majority deals and 66 companies that belong to the following set of industries, as defined by their two-digit NACE[2] (Statistical Classification of Economic Activities in the European Community) codes: (a) Financial and Insurance Services (64-66), (b) Real Estate Activities (68), and (c) Public Administration (84). This approach is similar to Bernstein et al. (2019) and Michaely and Roberts (2012) and aims

[1] for example, Lavery and Wilson, 2024; Paglia and Harjoto, 2014
[2] NACE Rev. 2.

to avoid sectors that are subject to substantial amounts of regulation (Michaely and Roberts, 2012).

Subsequently, we retrieve financial information for the years 2016 to 2023, including comprehensive income statement and balance sheet data, from Orbis, a Bureau van Dijk data product. A key challenge in this step is ensuring that we download financial data for the correct entity, as companies may appear under different names across the two databases. PitchBook provides a key advantage in this context, as it maintains records of historical company names, enabling us to match companies across databases even in cases of corporate name changes. In some instances, we validate records by cross-verifying unique company information, such as addresses and websites.

Orbis compiles historical financial data from "Companies House," the official national registrar in the UK. The extent of the financial information companies must file varies depending on their size. Under certain criteria[3], companies are defined as "small" and permitted to file abridged accounts, with an abbreviated balance sheet and no profit/loss statement. Due to the limited financial information available in the abridged accounts of small companies, we drop such entities from our dataset. Further, we manually review firms on Companies House and remove those from our sample that have changed their accounting period length for a financial year during the observation window, as such changes could introduce bias to our results. Similar to Wilson et al. (2012), we remove companies that appear not to be active or trading during our observation period. These steps yield an initial treatment group of 441 companies.

5.2 Control group setup

In an ideal setting, each PE-backed company in the treatment group would be compared to an identical company, with the only difference being that the comparable company is not PE-backed. However, since this is not feasible in a real-world context, we construct a control group and apply the Difference-in-Differences method. As Bernstein et al. (2019) emphasize, PE-backed firms are not randomly selected; they tend to be larger and more leveraged than the average company. To account for these differences, we follow the approach of Bernstein et al. (2019), which builds on Boucly et al. (2011), and select control firms based on the same two-digit NACE code as well as similar size, leverage, and profitability in 2019. We use total assets

[3] A company is classified as "small" if it meets at least two of the following criteria: (i) annual revenue not exceeding £15 million, (ii) total assets of £7.5 million or less, or (iii) 50 or fewer employees.

and ROA as a proxy for size and profitability, respectively. In addition, we define leverage as total debt divided by total assets and ROA as net profit over average total assets. Each matched firm in our control group meets the following four criteria: (a) it has the same two-digit NACE code as the treatment firm; (b) its total assets fall within a 30% bandwidth of the target's assets; (c) its leverage is within a 30% bandwidth of the target firm's leverage; (d) its ROA falls within a 30% bandwidth of the target firm's ROA. For each treatment firm, we match up to five control firms. If a target has more than five potential matches, we select the closest five based on the sum of the quadratic differences between the target firm's and the control firm's total assets, leverage, and ROA.

Based on these criteria, we drop 250 treatment firms that have no match. As a result, 191 out of the 441 firms in our treatment group find a match, resulting in a matching success rate of 43.31%. In total, our 191 treatment firms were matched to 587 control companies. Following a similar procedure as for the treatment companies, we retrieve financial information for the control firms from Orbis. A detailed analysis of our sample, including summary statistics, is presented in the next section.

5.3 Data summary and constructed variables

Following Bernstein et al. (2019), two additional financial metrics are defined: debt issuance and equity injection. Debt issuance is measured as the change in total debt. Equity injection is calculated as the change in total equity minus net profit. Both of these metrics are normalized by average total assets, calculated as the sum of total assets in years t and $t-1$, divided by two. All financial ratios are winsorized at the 2% level to mitigate the effect of outliers. The formula for each variable used during the thesis is provided in the Appendix.

Tables 1 and 2 provide an insight into our sample. Table 1 shows the industry distribution of our final treatment group sample alongside that of the entire universe of companies in the UK in 2019. Specifically, the column "Target firms (%)" refers to our final sample of PE-backed firms after excluding unmatched target firms, while the column "All firms (%)" represents the population of UK companies after filtering out small companies and those operating in the Financial and Insurance Services, Real Estate, and Public Administration sectors. The industry classification is based on NACE codes. The largest shares of PE-backed firms in our sample are concentrated in the Services[4] and Manufacturing sector. This

[4] The services industry category consolidates the following sectors: professional, scientific, and technical activities; administrative and support service activities; education; human health and social work activities; other service activities; and arts, entertainment, and recreation.

concentration is consistent with other recently published literature on deal-level PE (Bernstein et al. (2019), Jenkinson and Sousa (2015)). Compared to the overall population of UK firms, our PE-backed sample is slightly more concentrated in the Information & Communication, Manufacturing, and Wholesale & Retail Trade sectors. This concentration is offset by relatively lower representation in the Services sector.

Table 2 offers additional insights by presenting descriptive statistics for our final sample in 2019. The differences between the treatment and control group's values are insignificant at the 10% level. These statistics provide initial evidence that the two groups were quite similar pre-pandemic. Going further, Table 3 allows us to examine the parallel trends assumption for the first time, a key requirement of the Difference-in-Differences approach, by presenting one-year (Panel A) and two-year (Panel B) growth rates. The results largely support this requirement, as treatment and control groups followed similar trends prior to the onset of the pandemic with respect to most variables. Mean growth rates show statistically insignificant differences at the 10% level for most metrics. Nevertheless, we observe a statistically significant difference in the mean two-year growth rate in total debt, with PE-backed firms exhibiting a higher pre-pandemic growth rate. We will discuss this deviation from parallel trends as a limitation in more detail in Section 7.6, along with its implications for our findings in Section 7.1.1.

Table 1: Industry distribution - treatment group vs all UK firms

Industry	Target Firms (Count)	Target Firms (%)	All Firms (UK %)
Accommodation & Food Services	4	2.09	3.83
Construction	11	5.76	9.13
Information & Communication	32	16.75	10.32
Manufacturing	33	17.28	8.30
Mining	1	0.52	0.76
Services	79	41.36	52.02
Transport & Storage	5	2.62	3.12
Utilities	3	1.57	2.38
Wholesale & Retail Trade	23	12.04	10.12
Total	*191*	*100.00*	*100.00*

This table presents the industry distribution of companies across different categories. The "Target Firms (Count)" column shows the number of PE-backed firms in our test sample by industry. The "Target Firms (%)" column shows the percentage distribution of PE-backed firms in our sample across industries. The "All Firms (UK %)" column represents the percentage distribution of all UK firms with available financial data for 2019 for the relevant industries.

Table 2: Descriptive statistics - PE-backed and control firms

	PE-backed companies				**Control companies**				**Difference**
Variable	**N**	**Mean**	**Median**	**SD**	**N**	**Mean**	**Median**	**SD**	**Mean**
Assets (£000)	191	102555.08	22677.00	359921.26	587	62730.19	17348.00	246597.51	39824.89
Revenue (£000)	191	158541.74	22526.00	1188023.64	537	45236.09	17834.00	118605.55	113305.65
ROA	191	0.12	0.09	0.09	564	0.11	0.09	0.08	0.00
Debt (£000)	191	46458.27	3802.00	230514.36	587	26507.12	2862.00	144622.87	19951.14
Equity financing/assets	187	-0.03	0.00	0.08	570	-0.04	-0.00	0.09	0.01
Debt issuance/assets	187	0.02	0.01	0.16	570	0.01	0.00	0.12	0.00

This table presents summary statistics of financial data for the pre-pandemic year (2019) for PE-backed companies and control firms. The "PE-backed companies" columns show data for firms in our treatment sample that have at least one match. The "Control companies" columns represent non-PE-backed firms matched based on two-digit NACE industry code, total assets, return on assets, and leverage (within a 30% range) in the pre-pandemic year. For each group, we report the number of observations (N), mean, median, and standard deviation (SD) of key financial metrics. The "Difference" column displays the mean difference between PE-backed and control firms. All financial ratios are winsorized at the 2% level to mitigate the influence of outliers. Statistical significance of differences is indicated as follows: *** for the 1% level, ** for the 5% level, and * for the 10% level.

Table 3: One and two-year growth rates - PE-backed and control firms

	PE-backed companies				Control companies				Difference
Variable	**N**	**Mean**	**Median**	**SD**	**N**	**Mean**	**Median**	**SD**	**Mean**
Panel A: 1-year Growth 2018-2019									
Total Assets Growth (%)	187	17.28	11.10	28.31	570	14.20	9.15	24.81	3.08
Revenue Growth (%)	180	12.33	8.27	24.86	495	9.83	5.81	22.68	2.5
ROA Change	181	0.00	-0.01	0.10	518	0.00	0.00	0.06	0
Total Debt Growth (%)	158	23.05	9.82	95.66	457	12.21	1.83	71.28	10.84
Equity financing/assets Change	167	-0.01	0.00	0.17	521	-0.01	0.00	0.13	0
Debt issuance/assets Change	173	-0.02	0.00	0.21	549	0.00	0.00	0.22	-0.02
Panel B: 2-year Growth 2017-2019									
Total Assets Growth (%)	175	44.29	29.10	55.91	551	34.40	21.49	55.78	9.9**
Revenue Growth (%)	160	24.31	15.08	37.83	462	23.14	13.87	42.99	1.16
ROA Change	162	-0.02	-0.01	0.14	488	0.00	0.00	0.08	-0.02
Total Debt Growth (%)	139	55.71	32.90	114.70	436	25.79	8.62	93.02	29.92***
Equity financing/assets Change	153	0.03	0.06	0.23	490	0.05	0.04	0.16	-0.02
Debt issuance/assets Change	165	0.04	0.02	0.23	527	0.02	0.00	0.25	0.02

This table presents growth rates for key financial metrics for PE-backed and control firms over one and two years before the pandemic. Panel A displays one-year growth rates (2018-2019), while Panel B shows two-year growth rates (2017-2019). The "PE-backed companies" columns show data for firms in our treatment sample that have at least one match. The "Control companies" columns represent non-PE-backed firms. For each group, we report the number of observations (N), mean, median, and standard deviation (SD). The "Difference" column displays the mean difference between PE-backed and control firms. All financial ratios are winsorized at the 2% level to mitigate the influence of outliers. Statistical significance of differences is indicated as follows: *** for the 1% level, ** for the 5% level, and * for the 10% level.

6 Methodology

This section begins by presenting the standard Difference-in-Differences model used to estimate the treatment effect of private equity ownership during and after the COVID-19 pandemic. We then assess the validity of the parallel trends assumption, which is a key identifying condition for the DiD approach. Finally, we introduce a dynamic DiD specification to examine how treatment effects evolve over time.

6.1 Standard Difference-in-Differences model

The Difference-in-Differences methodology has been used previously in empirical research examining the effects of private equity ownership on firm performance. For example, Boucly et al. (2011) apply it to assess the performance of leveraged buyouts in France, while Bernstein et al. (2019) examine PE-backed firms during and after the Global Financial Crisis. More recently, Lavery and Wilson (2024) applied this method in the context of the COVID-19 pandemic.

Building on these prior studies, we begin by introducing the standard DiD model employed in our analysis. This specification estimates the average treatment effect of private equity ownership relative to comparable industry peers on key financial metrics during and after the pandemic. Therefore, we estimate the following equation:

$$y_{it} = \alpha_i + \alpha_t + \beta_1 PE_i * During_t + \beta_2 PE_i * After_t + \theta X_i * During_t + \theta X_i * After_t + \varepsilon_{it} \quad \textbf{(1)}$$

In this specification, y_{it} denotes the dependent variable for firm i at time t, while α_i and α_t represent firm and time fixed effects, respectively. PE_i is a dummy variable that equals one for all PE-backed firms and zero for all control firms. $During_t$ is a time dummy variable that takes the value one for the pandemic period (2020-2021) and zero for the pre- and post-pandemic period (2017-2019, 2022-2023). Similarly, the dummy $After_t$ takes a value of one for the post-pandemic period (2022–2023) and of zero otherwise. To account for pre-existing differences in firm characteristics, we include a set of control variables (X_i): the logarithm of total assets (firm size), cash holdings scaled by total assets (liquidity), sales growth (growth trajectory), leverage (debt intensity), and return on assets (profitability). Following Lavery and Wilson (2024), which in turn builds on Bernstein et al. (2019), we measure these variables in the pre-pandemic year (2019) and interact them with the time period dummies $During_t$ and $After_t$. The main coefficients of interest are β_1 and β_2. β_1 captures the differential impact of

private equity ownership during the pandemic years relative to the pre-COVID baseline, while β_2 reflects any post-COVID effects. These results should allow us to assess how key financial metrics of PE-backed firms evolved relative to their non-PE-backed counterparts over time. The primary distinction between our specification and those used in the studies from Boucly et al. (2011), Bernstein et al. (2019), and Lavery and Wilson (2024) lies in our use of two distinct time dummies, rather than a single post-treatment dummy. This approach allows us to separately identify the effects of PE ownership on firm performance and financing decisions during the pandemic and in the subsequent period.

In Section 7, we present the results of these regressions, both with and without the inclusion of control variables. In addition to our main specification, we conduct a series of robustness checks using alternative control groups. These alternative matching specifications and their rationale are explained in Section 7.5, while the corresponding results are provided in the Appendix.

6.2 Parallel trends assumption validation

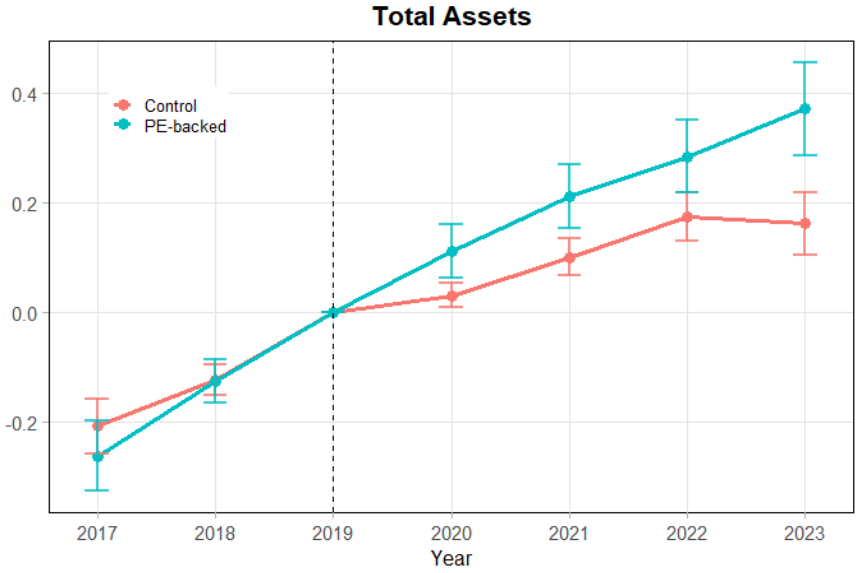
Following the introduction of our Difference-in-Differences model, this section assesses the validity of the parallel trends assumption, a key requirement of the DiD approach. In conjunction with the summary statistics presented in Table 3, which compare the two groups across a wide range of financial indicators, we estimate the following model:

$$y_{it} = \alpha_i + \alpha_t + \varepsilon_{it} \quad \textbf{(2)}$$

In this specification, y_{it} denotes the outcome variable of interest for firm i at time t, while α_i and α_t represent firm and year fixed effects, respectively. The coefficient for the year 2019 is normalized to zero, making it the reference period. Standard errors are clustered at the firm level to account for within-firm correlation over time. The regression is estimated separately for PE-backed and control firms over the time period of 2017 to 2023 to assess the presence of parallel pre-treatment trends. Following the approach of Bernstein et al. (2019), control companies enter the model the same year as their respective PE counterparts, either in 2017 or in the year of the PE deal, if it occurred later. All outcome variables expressed in monetary terms and not already scaled by firm size are transformed using the natural logarithm. This transformation mitigates skewness and allows percentage-based interpretation of the estimated effects. Figures 1 and 2 provide a graphical presentation of Equation (2) for both groups, using total assets and ROA as the outcome variables.

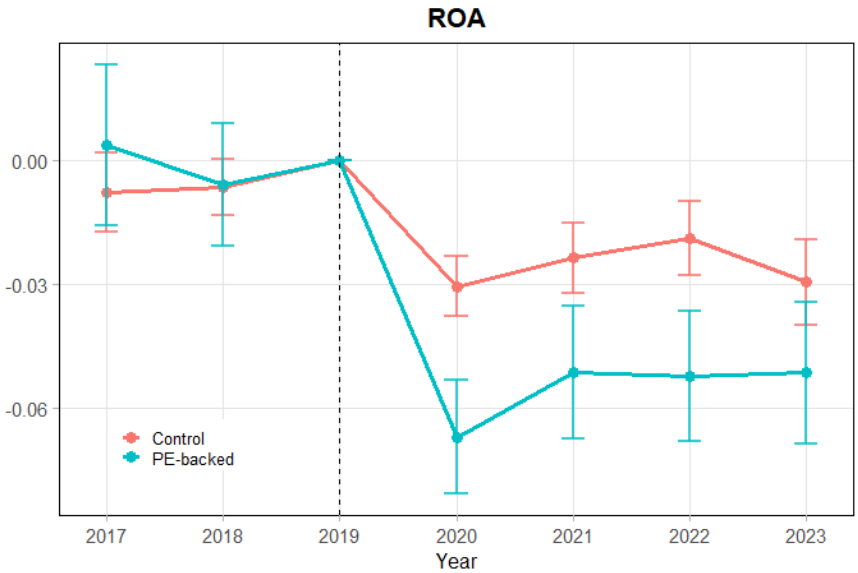
We can observe that the treatment and control groups follow similar trends in the pre-pandemic period. Combined with the results in Table 3, we find strong support for the parallel trends assumption for most key financial metrics, with an exception related to debt-financing which we discuss as a limitation in Section 7.6. Following the onset of the pandemic, however, PE-backed companies begin to diverge from the control counterparts. This provides initial insight into the effect of PE ownership on total assets and ROA during and after the COVID-19 pandemic.

Figure 1: Year-fixed effect estimates for total assets (2017-2023)



This figure presents the change in total assets for PE-backed firms and control firms in our sample. Specifically, it illustrates the year fixed effects α_t from the equation: $y_{it} = \alpha_i + \alpha_t + \varepsilon_{it}$, where α_t captures year fixed effects, α_i firm fixed effects, and ε_{it} the error term. We use 2019 as the benchmark year and normalize the corresponding coefficient to zero. The equation is estimated separately for PE-backed and control firms. We illustrate the estimates with 95% confidence intervals above and below each point estimates and cluster standard errors at the firm level.

Figure 2: Year-fixed effect estimates for ROA (2017-2023)



This figure presents the change in total assets for PE-backed firms and control firms in our sample. Specifically, it illustrates the year fixed effects α_t from the equation: $y_{it} = \alpha_i + \alpha_t + \varepsilon_{it}$, where α_t captures year fixed effects, α_i firm fixed effects, and ε_{it} the error term. We use 2019 as the benchmark year and normalize the corresponding coefficient to zero. The equation is estimated separately for PE-backed and control firms. We illustrate the estimates with 95% confidence intervals above and below each point estimates and cluster standard errors at the firm level.

6.3 Dynamic specification of the DiD model and year-by-year effects

To complement our standard DiD model, we estimate a dynamic specification to examine how the effect of private equity ownership evolved over time. Specifically, we estimate the following equation:

$$y_{it} = \alpha_i + \alpha_t + \sum \beta_k (PE_i) + \varepsilon_{it} \quad \textbf{(3)}$$

In this formulation, we interact the PE ownership indicator with year-specific dummies for each period in the sample. As in the main model, we include firm fixed effects (α_i) and time fixed effects (α_t). This setup enables us to observe how the outcome variables of PE-backed firms evolved compared to their non-PE-backed peers on a year-by-year basis. Given the nature of our study and the construction of the control group, we expect the estimated β_k coefficients to be statistically insignificant in the pre-pandemic years, in line with the parallel trends assumption. Statistically significant differences are expected primarily during the pandemic and in its aftermath, allowing us to capture potential lagged or persistent effects of private equity ownership through the crisis and into the recovery period.

In summary, our empirical strategy combines a standard Difference-in-Differences framework with a dynamic specification to estimate the impact of private equity ownership on firm-level outcomes during and after the COVID-19 pandemic. The dynamic approach allows us not only to further verify the parallel trends assumption but also to observe how performance differences between treatment and control firms unfolded on a year-by-year basis.

7 Results and analysis

This section presents the empirical results of equations (1), (2) and (3) defined in the methodology section. The analysis follows the hypotheses defined in section 4, with a focus on financing decisions and operating performance metrics. For each outcome variable, we estimate the DiD models, both with and without control variables, and report the results separately for the pandemic period (2020-2021) and the post-pandemic period (2022-2023).

7.1 Financing metrics

We begin our analysis with a focus on key financing metrics, including debt financing and leverage, cost of debt, and equity injections.

7.1.1 Debt financing and leverage

This section examines the impact of PE ownership on total debt, debt issuance, and leverage relative to industry peers during and after the COVID-19 pandemic. We present year-fixed effects estimates for total debt and leverage in Figures 3 and 4, respectively. In addition, regression results are reported in Table 4.

Figure 3 reveals a clear divergence in total debt between PE-backed firms and industry peers beginning in 2020. While non-PE-backed firms' debt levels stopped growing and even declined slightly after 2019, PE-backed companies continued to increase debt levels. The growth only slowed in 2023, when monetary policy tightened further. The regression results in Table 4 confirm these observations. The estimated coefficients indicate that, all else equal, total debt was 36.8% higher for PE-backed firms during the pandemic compared to control firms, relative to their respective pre-pandemic levels. This gap widened to 61.8% in the post-pandemic period, with both results statistically significant. In other words, these coefficients capture how much faster PE-backed firms increased their debt relative to non-PE-backed firms during each period, after considering pre-pandemic differences between the two groups. The year-by-year analysis in Panel B confirms the continuing divergence observed in Figure 3.

In addition, PE-backed firms experienced a significant relative increase in total assets, with the gap increasing after the pandemic, as illustrated in Figure 1 and confirmed by the regression results in Table 4. The increase in assets, with debt growing faster, indicates that PE-backed firms primarily financed their asset growth with new debt. This observation is supported by our results on leverage in Table 4, which show statistically significant relative increases in leverage ratios for PE-backed firms during the pandemic (4.0 percentage points)

and post-pandemic period (5.3 percentage points). Figure 4 verifies that PE-backed firms increased their leverage ratios while industry peers continuously slightly decreased them. These findings differ from the results of Bernstein et al. (2019), who studied the GFC, and found that the coefficients related to leverage were insignificant. A plausible explanation rests on the difference in credit market conditions between the two crises: compared to the GFC, debt financing remained relatively more available during the pandemic at low interest rates, which, according to Gompers et al. (2022), many PE sponsors preferred over other financing options.

The regression results on debt issuance with controls in Table 4 reveal a positive and statistically significant effect (2.0 percentage points) during the pandemic period, aligning with findings from Lavery and Wilson (2024). However, in the post-pandemic period, this effect becomes statistically and economically insignificant, suggesting that the relative debt issuance between the two groups returned to pre-pandemic trends.

Importantly, the results on total debt and debt issuance in the post-pandemic period require careful interpretation. While debt levels continued to widen between the two groups, the coefficients on debt issuance indicate no significant difference in debt growth. This apparent contradiction can be explained by considering the pre-pandemic trends. While debt levels followed similar trends (Figure 3), PE-backed companies increased debt at a higher rate between 2018 and 2019 than control firms. Post-pandemic, the differential in debt issuance rates between the two groups returned to pre-pandemic levels, as indicated by the insignificant coefficient, but the pre-existing differences led to a continued widening in total debt. This case illustrates a limitation discussed in Section 7.6. Despite the use of a matching procedure to construct a comparable control group, the pre-pandemic differences in debt growth trends suggest that the parallel trends assumption may not fully hold for this variable, despite the overlap of confidence intervals (Figure 3) and the insignificant pre-pandemic coefficients in the year-by-year analysis (Table 4 - Panel B).

Overall, the results provide strong support for Hypothesis 1A. During the pandemic, PE-backed firms exhibited a relative increase in total debt, with debt issuance 2.0 percentage points higher and leverage ratio 3.8 percentage points higher compared to control firms. PE-backed firms seem to benefit from better access to debt markets and stronger relationships with lenders, easing debt finance during crises. In addition, a greater tolerance towards debt may have enabled PE-backed firms to increase leverage ratios further (Figure 4).

Regarding the post-pandemic period, our findings also provide support for Hypothesis 1B. PE-backed firms continued to slightly increase debt levels rather than paying it down as

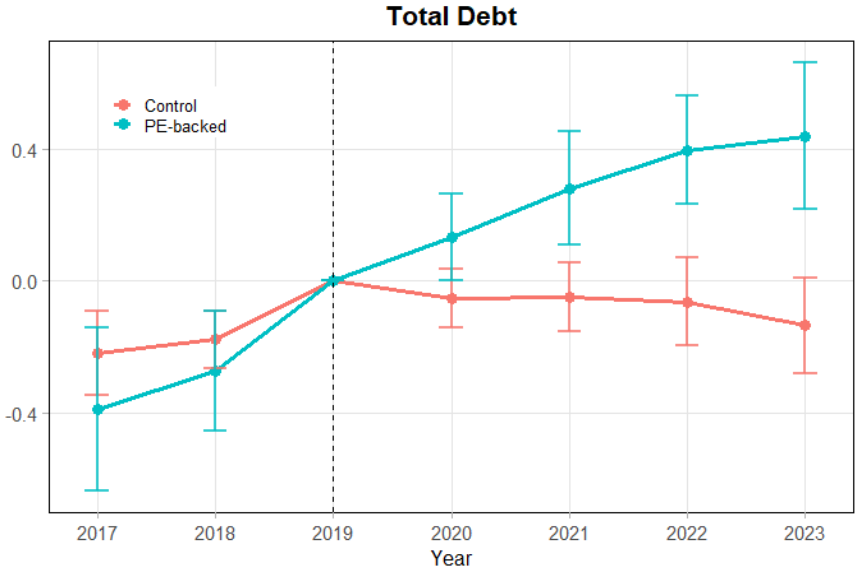
interest rates increased, while industry peers deleveraged in 2023, with leverage ratios 5.2 percentage points higher for PE-backed firms. PE sponsors may have identified post-pandemic growth opportunities for their portfolio companies which may have required them to deploy capital there and even raise more debt, instead of paying down the pre-existing debt.

Table 4: Regression results on financing metrics

Variable	Total Assets		Total Debt		Debt Issuance		Leverage		Cost of Debt		Equity Issuance	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Baseline DiD Results												
PE × During	0.116***	0.086**	0.368***	0.326***	0.018*	0.02*	0.04***	0.038***	-0.015	-0.015	0.014*	0.014
	(0.036)	(0.037)	(0.096)	(0.1)	(0.01)	(0.01)	(0.012)	(0.013)	(0.009)	(0.01)	(0.008)	(0.009)
PE × After	0.174***	0.132***	0.618***	0.533***	0.001	0.003	0.053***	0.052***	-0.018	-0.015	0.015*	0.018**
	(0.049)	(0.049)	(0.126)	(0.131)	(0.01)	(0.01)	(0.016)	(0.017)	(0.012)	(0.013)	(0.009)	(0.009)
Panel B: Year-by-Year Effects												
PE × 2018	-0.003	-0.007	-0.097	-0.099	0.02	0.018	-0.004	-0.004	0.004	0.006	0	-0.003
	(0.024)	(0.024)	(0.103)	(0.109)	(0.019)	(0.02)	(0.013)	(0.013)	(0.014)	(0.014)	(0.012)	(0.012)
PE × 2020	0.081***	0.074**	0.185**	0.14*	0.026	0.02	0.021**	0.013	-0.006	-0.006	0.014	0.009
	(0.027)	(0.029)	(0.08)	(0.083)	(0.018)	(0.019)	(0.01)	(0.011)	(0.01)	(0.011)	(0.01)	(0.011)
PE × 2021	0.111***	0.095***	0.33***	0.33***	0.024	0.031*	0.044***	0.042***	-0.015	-0.018	0.013	0.011
	(0.034)	(0.037)	(0.102)	(0.108)	(0.018)	(0.019)	(0.013)	(0.014)	(0.011)	(0.012)	(0.011)	(0.012)
PE × 2022	0.11***	0.088**	0.459***	0.414***	-0.001	0.001	0.046***	0.043***	-0.017*	-0.016	0.01	0.009
	(0.041)	(0.042)	(0.107)	(0.114)	(0.016)	(0.017)	(0.015)	(0.015)	(0.009)	(0.01)	(0.011)	(0.011)
PE × 2023	0.21***	0.182***	0.575***	0.509***	0.02	0.023	0.046**	0.041**	-0.01	-0.008	0.021*	0.015
	(0.052)	(0.054)	(0.136)	(0.143)	(0.017)	(0.018)	(0.019)	(0.02)	(0.016)	(0.017)	(0.012)	(0.013)
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Controls	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
N	5380	4582	4612	3986	5089	4344	5380	4582	3551	3160	4938	4291

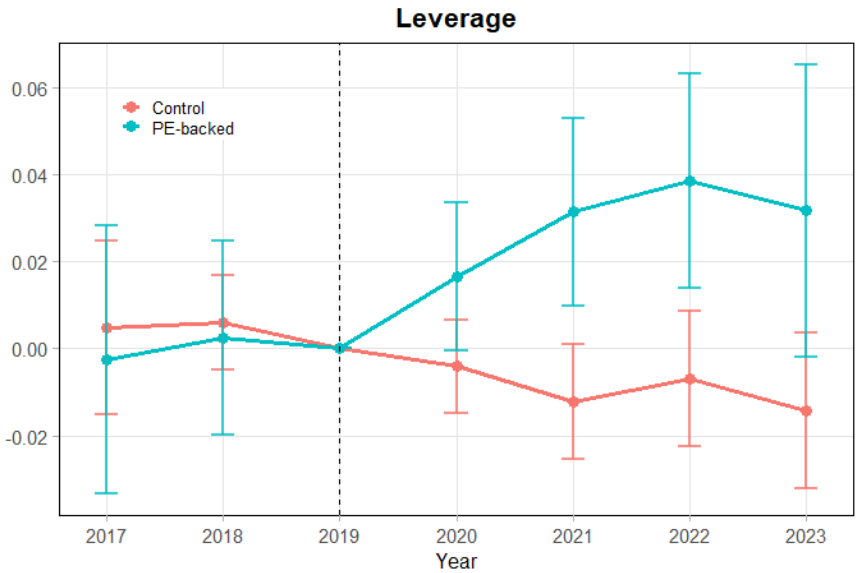
This table presents the impact of PE ownership on firm financing metrics during and after the COVID-19 pandemic. Panel A reports results for our baseline Difference-in-Differences model (Equation 1), where PE is a dummy variable equal to one for PE-backed firms and zero for control firms. "During" is a time dummy that equals one for the pandemic period (2020-2021) and zero otherwise, while "After" equals one for the post-pandemic period (2022-2023) and zero otherwise. Panel B displays estimates from our dynamic model (Equation 3), with 2019 being the reference year. Dependent variables include Total Assets, Total Debt, Debt Issuance, Leverage, Cost of Debt, and Equity Issuance. All specifications include year and firm fixed effects. Even-numbered columns consider control variables (firm size, cash holdings scaled by assets, sales growth, leverage, and return on assets) measured in 2019 and interacted with time dummies. We cluster standard errors (in parentheses) at the firm level. Statistical significance is denoted by *** for the 1% level, ** for the 5% level, and * for the 10% level.

Figure 3: Year-fixed effect estimates for total debt (2017–2023)



This figure presents the change in total debt for PE-backed firms and control firms in our sample. Specifically, it illustrates the year fixed effects α_t from the equation: $y_{it} = \alpha_i + \alpha_t + \varepsilon_{it}$, where α_t captures year fixed effects, α_i firm fixed effects, and ε_{it} the error term. We use 2019 as the benchmark year and normalize the corresponding coefficient to zero. The equation is estimated separately for PE-backed and control firms. We illustrate the estimates with 95% confidence intervals above and below each point estimates and cluster standard errors at the firm level.

Figure 4: Year-fixed effect estimates for leverage (2017–2023)



This figure presents the change in leverage ratios for PE-backed firms and control firms in our sample. Specifically, it illustrates the year fixed effects α_t from the equation: $y_{it} = \alpha_i + \alpha_t + \varepsilon_{it}$, where α_t captures year fixed effects, α_i firm fixed effects, and ε_{it} the error term. We use 2019 as the benchmark year and normalize the corresponding coefficient to zero. The equation is estimated separately for PE-backed and control firms. We illustrate the estimates with 95% confidence intervals above and below each point estimates and cluster standard errors at the firm level.

7.1.2 Cost of debt

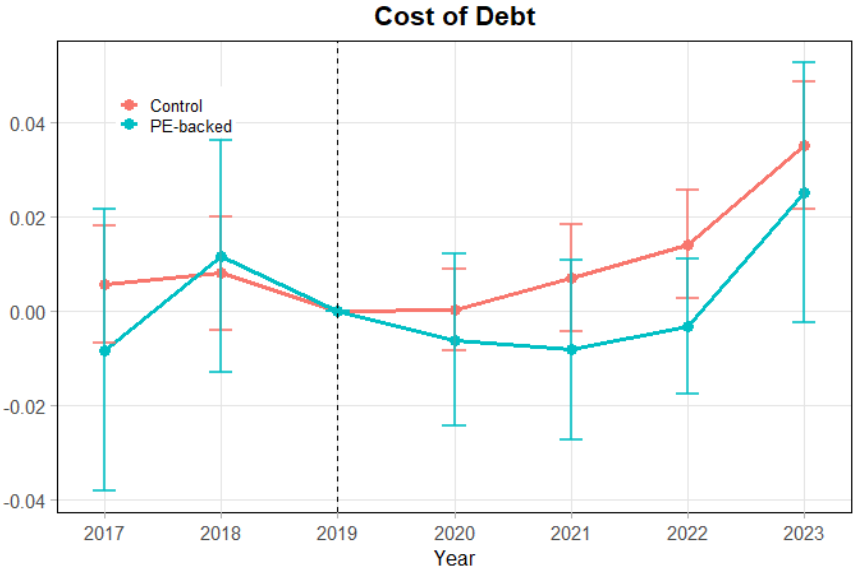
We next examine borrowing costs, measured as cost of debt, to test Hypotheses 2A and 2B. Table 4 presents the regression results for this metric in columns 9 and 10, while Figure 5 illustrates the estimated year fixed effects as defined in Equation (2).

Contrary to our initial expectations, we do not find a statistically significant relative decrease in cost of debt for PE-backed firms compared to control firms during the pandemic period. The estimated coefficient is negative but not statistically significant. This suggests that while PE-backed firms did not achieve relatively lower borrowing costs during the pandemic after considering pre-pandemic differences, they also did not face higher costs despite their relative increase in debt levels. In the post-pandemic period, the statistical significance and economic magnitude of the results do not change compared to the pandemic period. In addition, Figure 5 highlights the impact of the rising interest rates on the cost of debt, as both groups faced increasing borrowing costs.

While we do not find evidence for a relative decrease in borrowing costs for PE-backed companies (Hypothesis 2A), the fact that borrowing costs did not increase despite the significant relative rise in debt levels and leverage ratios for PE-backed companies provides partial support for the idea behind Hypothesis 2A. PE ownership has advantages not only in terms of securing additional debt financing during a crisis (Hypothesis 1A) but also in terms of achieving more attractive borrowing terms during the same period.

Regarding Hypothesis 2B, our results provide support in favor of it. The consistency in estimated coefficients from the pandemic to the post-pandemic period indicates that PE-backed firms maintained their relative position post-pandemic, despite the increase in their debt levels.

Figure 5: Year-fixed effect estimates for cost of debt (2017–2023)



This figure presents the change in cost of debt for PE-backed firms and control firms in our sample. Specifically, it illustrates the year fixed effects α_t from the equation: $y_{it} = \alpha_i + \alpha_t + \varepsilon_{it}$, where α_t captures year fixed effects, α_i firm fixed effects, and ε_{it} the error term. We use 2019 as the benchmark year and normalize the corresponding coefficient to zero. The equation is estimated separately for PE-backed and control firms. We illustrate the estimates with 95% confidence intervals above and below each point estimates and cluster standard errors at the firm level.

7.1.3 Equity injections

As another component of company financing, we examine the development of equity injections for PE-backed firms and industry peers during and after the pandemic. Table 4 presents the regression results for equity injections in columns 11 and 12.

During the pandemic period, PE-backed firms exhibit a small positive coefficient (1.4 percentage points) in equity issuance relative to control firms. This effect is marginally statistically significant without controls but becomes insignificant with controls. However, this result becomes statistically more robust in our alternative matching specification (Table A.6 in the Appendix), when matching solely on size and profitability, which we conduct as a robustness check in Section 7.5. Overall, the magnitude of our results is comparable to Lavery and Wilson (2024) and slightly smaller than the estimates from Bernstein et al. (2019) for the global financial crisis. However, a crucial difference from the GFC lies in the credit market conditions: debt financing remained more widely available at favorable terms during the pandemic, which likely relatively reduced the reliance of PE firms on equity injections.

In the post-pandemic period, the effect increases slightly and becomes statistically more significant. The estimated coefficient indicates that PE-backed firms increased their equity issuance by approximately 1.8 percentage points more than industry peers (with controls). The year-by-year analysis in Panel B shows that the effect increases in economic magnitude and statistical significance, particularly in 2023, when monetary policy continues to tighten.

Our results provide partial support for Hypothesis 3A, which predicted that PE-backed firms would experience a relative increase in equity injections during the pandemic. We observe a positive coefficient for PE-backed firms, with statistical significance varying across matching specifications. This finding aligns with the economics of PE fund structures, which create strong incentives for PE sponsors to protect their investments through equity injections. During crises, GPs have considerable motivation to prevent failures of portfolio companies as total losses would negatively affect their carried interest and future fundraising prospects. Notably, Haque (2023) finds that, in case of increased risk of default, PE portfolio companies receive more equity contributions relative to industry peers. The author infers that these equity infusions help lowering the likelihood of financial distress. Similarly, De Silva et al. (2025) highlight that the ability of PE sponsors to provide capital to portfolio companies that are in financial distress is a competitive advantage.

Regarding Hypothesis 3B, which states that the differential in equity injections would decrease post-pandemic but remain above pre-pandemic levels, our findings provide mixed

support. Contrary to the hypothesis, we observe that the differential actually increased slightly from the pandemic to the post-pandemic period (from 1.4 to 1.8 percentage points with controls) and became more statistically significant. However, the magnitude remains modest, suggesting no significant change from the pandemic to the post-pandemic period. Nevertheless, the persistence and marginal increase in equity injections for PE-backed companies relative to industry peers post-pandemic, particularly in 2023, may reflect an adaptation by PE firms to the increasing interest rates. In addition, deal value in 2023 fell 26.5% from 2022 in Europe and dry powder has grown continuously since the beginning of the pandemic (PitchBook, 2024). Therefore, PE firms may have increasingly deployed their uninvested capital to support existing portfolio companies through equity injections.

7.2 Profitability

Following our analysis of company financing, we examine the operating performance of PE-backed firms relative to industry peers during and after the pandemic, addressing our Hypotheses 4A and 4B. In our evaluation, we focus on the following key financial metrics: revenue, EBIT, and ROA. This analysis is key to understanding how PE sponsorship influences operating performance in times of economic disruption and how it contributes to companies' recoveries.

7.2.1 Profitability results

We present Figures 2 (Section 6.2), 6, and 7, which plot the estimated year-fixed effects, as defined in Equation (2), for the outcome variables ROA, revenue, and EBIT, respectively. In addition, we estimate Equations (1) and (3) for the different outcome variables and report the results in Table 5.

Regarding revenue performance, Figure 6 shows that both groups followed broadly similar trends. PE-backed firms slightly underperformed control firms during the pandemic (2020-2021), followed by a stronger growth and recovery in the post-pandemic period. Regression results in Table 5 support those observations. The estimated coefficient for the pandemic period indicates a 4.4% underperformance relative to non-sponsored firms, while the post-pandemic coefficient shows a 2.9% overperformance. However, neither coefficient is statistically significant, indicating no substantial difference between the PE-backed and control firms in revenue performance. While the development in EBIT, presented in Figure 7, follows a similar trend to revenue, it shows more volatility for the PE-backed firms. The decline in 2020 was notably stronger, followed by a substantial recovery. Our regression results in Table

5 in columns 5 and 6 indicate an 11.8% underperformance during the pandemic, improving to a 6.8% underperformance in the post-pandemic period and indicating a partial recovery relative to industry peers. Nevertheless, both coefficients remain statistically insignificant. Our results on other profitability metrics, such as ROA, follow a similar pattern, as shown in Table 5 and Figure 2 (Section 6.2). With regards to ROA, the underperformance becomes statistically significant.

Our findings reject Hypothesis 4A, which predicted PE-backed firms would exhibit an operating outperformance compared to industry peers during the pandemic. We find that PE-backed firms underperformed control firms, with statistical significance varying across different performance metrics. This finding also contrasts with Lavery and Wilson (2024), who documented a slight, but significant operating outperformance of PE-backed companies during the pandemic. In addition, we find partial support in favor of Hypothesis 4B, which predicted that operating outperformance in the post-pandemic period would increase. While PE-backed firms exhibit a relative recovery after the pandemic, it does not lead to a statistically significant overperformance. Nevertheless, the direction of the effect is consistent with our expectations.

Notably, our results reveal an important development in the performance difference between PE-backed firms and their industry peers during the pandemic: the relative decrease in profitability metrics (EBITDA and EBIT) of PE-backed companies was significantly larger than their relative fall in revenue. This observation suggests that PE-backed companies faced significant challenges with cost control during the crisis. Two potential explanations arise for this observation. First, the timing of PE acquisitions could be the driving factor. This theory has two variants: companies that remained under PE ownership longer than the typical investment horizon (acquired in 2013-2014) may be underperforming firms that couldn't be divested pre-pandemic, making them vulnerable to the crisis. Alternatively, very recent acquisitions may have been in the middle of a transition, reducing their ability to implement cost-cutting measures when the pandemic hit. Second, PE sponsors may have transformed portfolio companies toward a higher operating leverage model with greater fixed costs relative to variable costs. This different cost structure compared to non-PE-backed firms would make profitability metrics of PE-backed firms more vulnerable to a revenue shock, such as the pandemic, as they would face greater difficulties with cost-cutting. To find support for either of the two explanations, we conduct additional regression analyses on our operating performance metrics while controlling for time under PE ownership at the onset of the pandemic (see Table A.1 in the Appendix). These analyses show only marginal differences from our previous results in Table 5, with the greater underperformance in profitability metrics

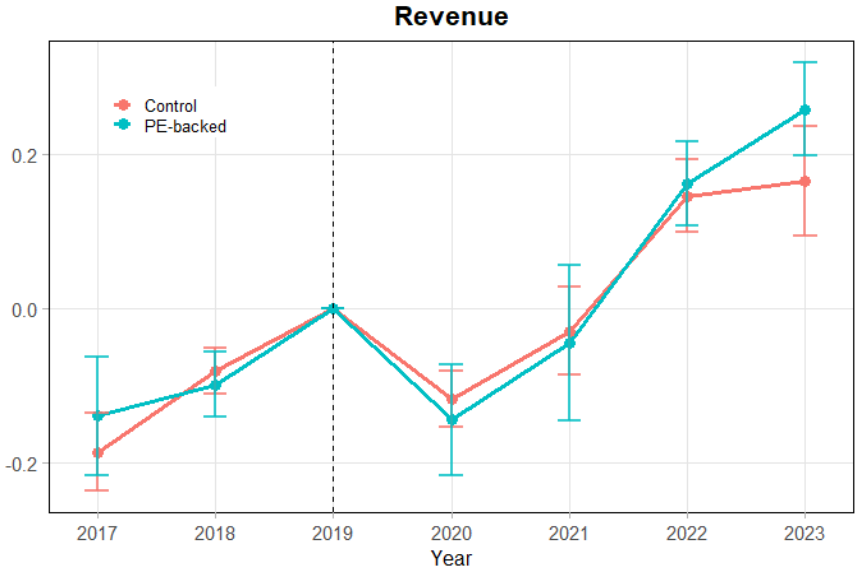
remaining consistent regardless of how long companies had been under PE ownership. This finding weakens the timing of PE acquisitions hypothesis and provides stronger support for the operating leverage theory. PE-backed firms appear to operate with cost structures that are less flexible during revenue shocks, with greater fixed costs relative to variable costs compared to industry peers, limiting their ability to adjust costs accordingly when revenues decline.

Table 5: Regression results on operating performance metrics

Variable	Revenue		EBITDA		EBIT		Net Income		ROA	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Baseline DiD Results										
PE × During	-0.038	-0.044	-0.174**	-0.202**	-0.134	-0.118	-0.128	-0.14	-0.037***	-0.036***
	(0.051)	(0.052)	(0.077)	(0.079)	(0.088)	(0.09)	(0.092)	(0.099)	(0.008)	(0.008)
PE × After	0.033	0.029	-0.096	-0.109	-0.093	-0.068	-0.058	-0.01	-0.033***	-0.029***
	(0.043)	(0.045)	(0.074)	(0.073)	(0.09)	(0.09)	(0.095)	(0.093)	(0.008)	(0.008)
Panel B: Year-by-Year Effects										
PE × 2018	-0.018	-0.024	0.075	0.066	0.106	0.112	0.139*	0.161*	0.001	-0.004
	(0.026)	(0.025)	(0.075)	(0.075)	(0.075)	(0.072)	(0.084)	(0.083)	(0.008)	(0.008)
PE × 2020	-0.027	-0.016	-0.118	-0.081	-0.192*	-0.134	-0.091	-0.071	-0.037***	-0.035***
	(0.041)	(0.044)	(0.097)	(0.101)	(0.112)	(0.113)	(0.126)	(0.133)	(0.008)	(0.008)
PE × 2021	-0.016	-0.029	-0.073	-0.079	0.059	0.072	0.004	0.007	-0.028***	-0.033***
	(0.059)	(0.063)	(0.095)	(0.1)	(0.094)	(0.096)	(0.107)	(0.111)	(0.009)	(0.01)
PE × 2022	0.016	0.008	-0.088	-0.069	-0.112	-0.074	-0.091	-0.05	-0.033***	-0.034***
	(0.036)	(0.038)	(0.09)	(0.091)	(0.099)	(0.1)	(0.117)	(0.118)	(0.009)	(0.009)
PE × 2023	0.094**	0.087*	0.068	0.075	0.096	0.121	0.187	0.194	-0.022**	-0.024**
	(0.048)	(0.051)	(0.096)	(0.097)	(0.117)	(0.12)	(0.13)	(0.135)	(0.01)	(0.011)
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Controls	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
N	4885	4505	4230	3974	4388	3980	4522	3936	4938	4291

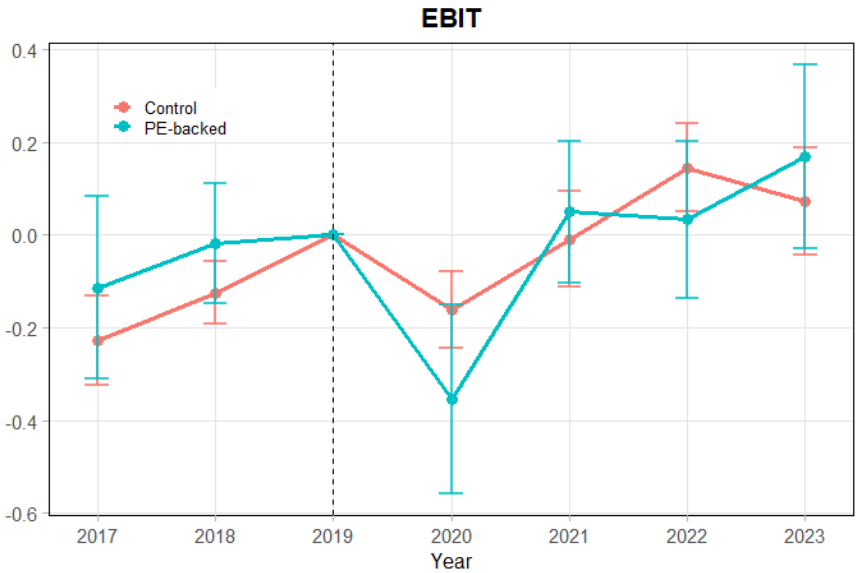
This table presents the impact of PE ownership on operating performance metrics during and after the COVID-19 pandemic. Panel A reports results for our baseline Difference-in-Differences model (Equation 1), where PE is a dummy variable equal to one for PE-backed firms and zero for control firms. "During" is a time dummy that equals one for the pandemic period (2020-2021) and zero otherwise, while "After" equals one for the post-pandemic period (2022-2023) and zero otherwise. Panel B displays estimates from our dynamic model (Equation 3), with 2019 being the reference year. Dependent variables include Revenue, EBITDA, EBIT, Net Income, and Return on Asset. All specifications include year and firm fixed effects. Even-numbered columns consider control variables (firm size, cash holdings scaled by assets, sales growth, leverage, and return on assets) measured in 2019 and interacted with time dummies. We cluster standard errors (in parentheses) at the firm level. Statistical significance is denoted by *** for the 1% level, ** for the 5% level, and * for the 10% level.

Figure 6: Year-fixed effect estimates for revenue (2017–2023)



This figure presents the change in revenue for PE-backed firms and control firms in our sample. Specifically, it illustrates the year fixed effects α_t from the equation: $y_{it} = \alpha_i + \alpha_t + \varepsilon_{it}$, where α_t captures year fixed effects, α_i firm fixed effects, and ε_{it} the error term. We use 2019 as the benchmark year and normalize the corresponding coefficient to zero. The equation is estimated separately for PE-backed and control firms. We illustrate the estimates with 95% confidence intervals above and below each point estimates and cluster standard errors at the firm level.

Figure 7: Year-fixed effect estimates for EBIT (2017–2023)



This figure presents the change in EBIT for PE-backed firms and control firms in our sample. Specifically, it illustrates the year fixed effects α_t from the equation: $y_{it} = \alpha_i + \alpha_t + \varepsilon_{it}$, where α_t captures year fixed effects, α_i firm fixed effects, and ε_{it} the error term. We use 2019 as the benchmark year and normalize the corresponding coefficient to zero. The equation is estimated separately for PE-backed and control firms. We illustrate the estimates with 95% confidence intervals above and below each point estimates and cluster standard errors at the firm level.

7.2.2 Profitability analysis

Based on the results discussed in the previous section, a key question remains: Why did PE-backed firms underperform relative to control firms during the pandemic in our sample, and why do our results differ from those of Lavery and Wilson (2024)? In this section, we explore potential reasons for this divergence, with a particular focus on sample construction and the role of exit timing.

A key methodological distinction between our study and that of Lavery and Wilson (2024) lies in the construction of the treatment group. Our dataset excludes deals completed in 2019, and, importantly, companies that were exited in 2021 and 2022. This ensures that all firms in our PE-backed sample experienced at least one year of private equity ownership both before and after the onset of the COVID-19 pandemic. In contrast, the setup used by Lavery and Wilson (2024) includes firms entered in 2019 and exited as early as 2021. Interestingly, the approach of Bernstein et al. (2019) to assess the performance of PE-backed companies during the Global Financial Crisis follows a similar design to that of Lavery and Wilson (2024). Their sample includes those firms that were under PE ownership at the end of 2007 and not exited by their sponsor until the end of 2008. They also document an operating overperformance of PE-backed firms relative to industry peers during the GFC. This difference in sample design opens the possibility that findings on the performance of PE-backed firms are conditional on the sample set criteria.

Accordingly, in the next section we explore whether the operating performance of PE-backed companies changes if we use the same set of treatment group criteria as Lavery and Wilson (2024) did and as Bernstein et al. (2019) did, applied in the context of the GFC. Specifically, we are interested in the impact of the inclusion of PE-backed companies acquired in 2019 and of PE-backed companies exited in 2021 and 2022 in our dataset.

Therefore, we define a new hypothesis:

Hypothesis 5: *Differences in the observed operating performance of PE-backed firms relative to control firms are driven by differences in sample construction criteria, specifically the year of entry and exit criteria used in the treatment group definition.*

7.3 Sensitivity of PE portfolio company performance to sample design

This section explores whether the observed underperformance of PE-backed firms during the pandemic is sensitive to the composition of the treatment group, as outlined in Hypothesis 5. As discussed previously, our baseline sample includes only those firms that were under private

equity ownership for at least one year both before and after the pandemic period. To assess the impact of alternative sample construction criteria, we adopt the criteria used by Lavery and Wilson (2024) and, similarly, by Bernstein et al. (2019) in the context of the Global Financial Crisis. This allows for a more direct comparison with their findings and helps evaluate whether differences in the observed performance are attributable to differences in sample setup.

7.3.1 Data, descriptive statistics, and methodology

For this new version of our sample, we begin by extending our treatment group sample to include companies acquired in 2019 and/or exited in 2021 and 2022. Thus, firms are required to remain under PE ownership for at least only one year during the pandemic. Consequently, our extended sample consists of 1,440 companies. This sample size is quite similar to the 1,516 companies identified by Lavery and Wilson (2024). After excluding non-majority deals and companies based on their industry classification, we retrieve financial data for 783 firms from Orbis. We identify matches for 353 treatment firms, resulting in 1,087 matched control firms. Figures B.1 and B.2 in the Appendix present a graphical illustration of the year-fixed effects from Equation (2) for the variables revenue and EBIT and show that both groups follow similar pre-pandemic trends. We conclude that our assessment of the parallel trends assumption from the original analysis remains unchanged.

Regarding methodology, we estimate the standard Difference-in-Differences model, as defined in Equation (1), and the dynamic specification, as defined in Equation (3), using the extended dataset.

7.3.2 Results and analysis

We repeat our analysis using the extended sample and report the results for financing metrics in Table A.2 and operating performance metrics in Table 6. The regression results for total debt, debt issuance, leverage, and cost of debt remain consistent in terms of both statistical significance and economic magnitude. The only notable change is a slight increase in statistical significance of the equity injections coefficients, though the size of the effect remains unchanged. Thus, our findings regarding Hypotheses 1A and 1B, 2A and 2B, and 3A and 3B remain robust to the changes in sample selection criteria.

For the operating performance metrics in the extended sample, Figures B.1 and B.2 in the Appendix show year-fixed effects for revenue and EBIT, respectively. The results reveal a noticeably different development compared to our original findings (Figures 5 and 6). From 2020 onward, PE-backed firms consistently, albeit modestly outperform industry peers in terms

of revenue. Table 6 confirms this observation: while the estimated coefficient for the pandemic period remains statistically insignificant, it becomes positive and indicates a 4.4% revenue outperformance, closely aligning with the results of Lavery and Wilson (2024) in terms of magnitude. In the post-pandemic period, outperformance of PE-backed firms increases to 7.5%, with the coefficient achieving statistical significance. EBIT and net income follow similar developments. The coefficient on EBIT for the pandemic becomes both economically and statistically insignificant in the extended sample, representing an 11 percentage point improvement from our original results. While Lavery and Wilson (2024) document a slight overperformance, our extended sample provides a substantial improvement across operating performance metrics during the pandemic period.

These observations support Hypothesis 5, confirming that the observed differences in PE performance relative to industry peers during the pandemic at least partially stem from sample construction criteria. Although the estimated effects during the pandemic increase considerably in the extended dataset, we do not find the significant outperformance predicted by Hypothesis 4A. Thus, we continue to reject this hypothesis.

The differing operating performance patterns observed between our original and the extended samples raise an important follow-up question: Did PE-backed companies exited in 2021 and 2022 exhibit superior operating performance during the pandemic compared to firms acquired in the same pre-pandemic period (2013 to 2018) but exited later or not exited at all yet? We hypothesize that firms exited during or shortly after the pandemic (2021-2022) demonstrated greater resilience to the external shock. These companies may have been more attractive to buyers in 2021-2022 due to the resilience and better operating performance they have shown during the pandemic. This rationale offers a potential explanation for the relatively better operating performance observed in the extended sample. It suggests that the improved profitability metrics may be driven by a selection bias that we faced in our original dataset.

In light of this reasoning, we establish our sixth and final hypothesis:

Hypothesis 6: *PE-backed firms exited during or shortly after the COVID-19 pandemic (2021-2022) exhibited superior operating performance during the crisis compared to PE-backed firms from the same acquisition period (2013-2018) that exited later or not yet.*

Table 6: Regression results on operating performance metrics - extended sample with 2019 deals and 2021-2022 exits

Variable	Revenue		EBITDA		EBIT		Net Income		ROA	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Baseline DiD Results										
PE × During	0.043	0.046	-0.075	-0.081	-0.019	0.007	-0.015	-0.001	-0.025***	-0.021***
	(0.036)	(0.038)	(0.056)	(0.059)	(0.065)	(0.069)	(0.068)	(0.074)	(0.006)	(0.006)
PE × After	0.081**	0.075*	-0.025	-0.053	-0.012	-0.002	0.001	0.023	-0.033***	-0.028***
	(0.036)	(0.038)	(0.066)	(0.066)	(0.08)	(0.082)	(0.087)	(0.088)	(0.008)	(0.007)
Panel B: Year-by-Year Effects										
PE × 2018	-0.027	-0.029	0.055	0.032	0.124**	0.11*	0.138*	0.143**	-0.002	-0.003
	(0.026)	(0.026)	(0.063)	(0.064)	(0.063)	(0.062)	(0.071)	(0.071)	(0.007)	(0.007)
PE × 2020	0.044	0.055*	-0.069	-0.043	-0.055	-0.016	0.005	0.02	-0.023***	-0.021***
	(0.029)	(0.03)	(0.064)	(0.067)	(0.075)	(0.077)	(0.082)	(0.087)	(0.007)	(0.007)
PE × 2021	0.042	0.032	0.022	0	0.196**	0.195**	0.125	0.106	-0.024***	-0.025***
	(0.043)	(0.046)	(0.072)	(0.076)	(0.08)	(0.084)	(0.082)	(0.087)	(0.008)	(0.008)
PE × 2022	0.046	0.04	-0.049	-0.056	-0.041	-0.02	-0.017	0.002	-0.037***	-0.037***
	(0.032)	(0.034)	(0.077)	(0.079)	(0.091)	(0.094)	(0.103)	(0.107)	(0.008)	(0.009)
PE × 2023	0.125***	0.116***	0.111	0.084	0.211**	0.187*	0.195*	0.156	-0.023**	-0.022**
	(0.04)	(0.044)	(0.084)	(0.086)	(0.098)	(0.103)	(0.114)	(0.12)	(0.009)	(0.01)
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Controls	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
N	7761	7022	6693	6171	6983	6228	7181	6185	7778	6710

This table presents the impact of PE ownership on operating performance metrics during and after the COVID-19 pandemic for the extended sample. Panel A reports results for our baseline Difference-in-Differences model (Equation 1), where PE is a dummy variable equal to one for PE-backed firms and zero for control firms. "During" is a time dummy that equals one for the pandemic period (2020-2021) and zero otherwise, while "After" equals one for the post-pandemic period (2022-2023) and zero otherwise. Panel B displays estimates from our dynamic model (Equation 3), with 2019 being the reference year. Dependent variables include Total Assets, Total Debt, Debt Issuance, Leverage, Cost of Debt, and Equity Issuance. All specifications include year and firm fixed effects. Even-numbered columns consider control variables (firm size, cash holdings scaled by assets, sales growth, leverage, and return on assets) measured in 2019 and interacted with time dummies. We cluster standard errors (in parentheses) at the firm level. Statistical significance is denoted by *** for the 1% level, ** for the 5% level, and * for the 10% level.

7.4 Performance heterogeneity based on exit timing

This section investigates whether the observed differences in operating performance among PE-backed firms during the pandemic in our two datasets are associated with those firms exited in 2021 and 2022, and thus not included in our original dataset, as outlined in Hypothesis 6. Specifically, we examine whether firms exited during or shortly after the COVID-19 pandemic performed differently from those acquired in the same period but exited later or not exited at all.

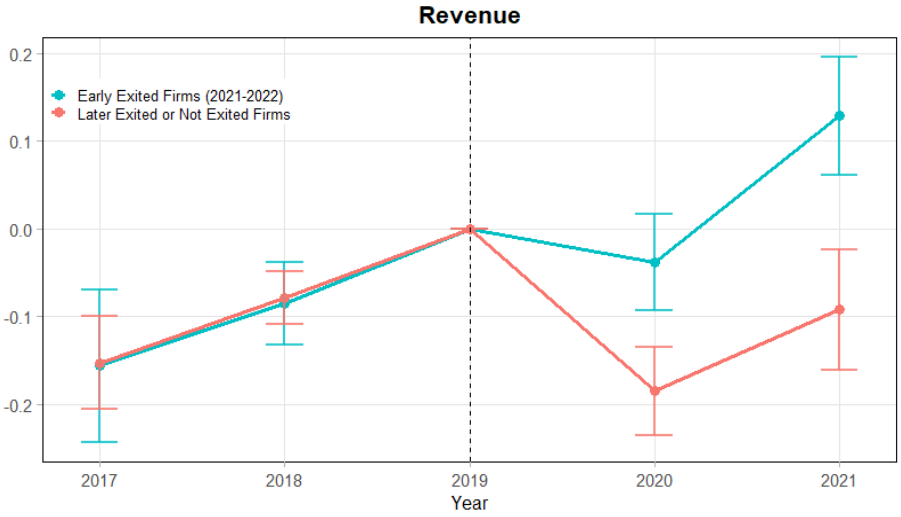
7.4.1 Data, descriptive statistics, and methodology

For our analysis, we split the PE-backed firms into two groups based on exit timing: (a) those exited in 2021 or 2022, which serve as the treatment group, and (b) those either exited later or not yet exited, which serve as the control group. Table A.3 in the Appendix presents summary statistics for both groups as of 2019. Figures 8 and 9, which illustrate Equation (2) for both groups for the outcome variables revenue and EBIT, show that both groups display parallel trends in the pre-pandemic period, supporting the validity of the DiD approach. We proceed to estimate the following standard Difference-in-Differences model. The estimated equation is as follows:

$$y_{it} = \alpha_i + \alpha_t + \beta_1(Exit_i * During_t) + \theta X_i * During_t + \varepsilon_{it} \quad \textbf{(4)}$$

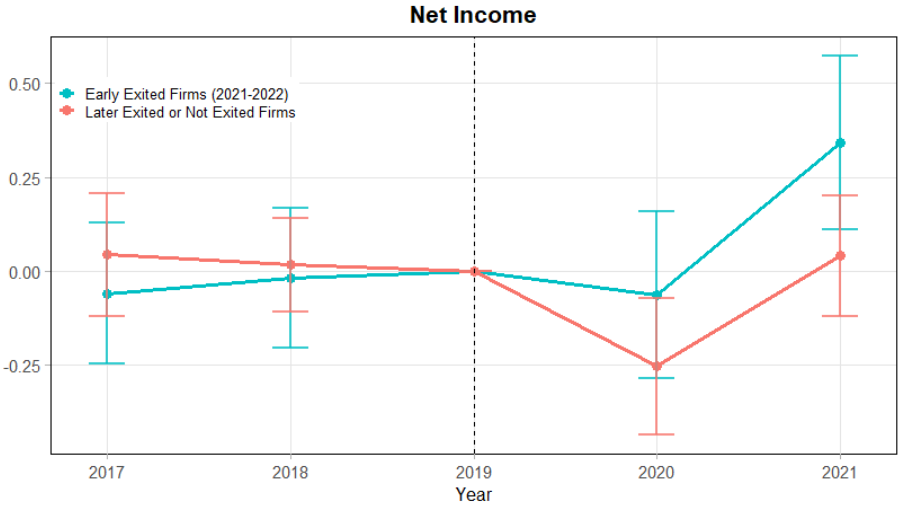
Here, y_{it}, α_i, α_t, and $During_t$ maintain their definitions from Equation (1). The variable $Exit_i$ is a dummy that equals to one if the firm exited PE ownership in 2021 or 2022, and zero otherwise. We include the same set of controls X_i as in Equation (1), cluster standard errors at the firm level, and apply the natural logarithm transformation to monetary outcome variables. The main coefficient of interest, β_1, captures the relative change in firm performance during the COVID-19 period for firms that exited PE ownership in 2021 or 2022, compared to those that did not. We proceed to estimate the model introduced in Equation (4) to assess whether firms that exited PE ownership in 2021 or 2022 experienced differential performance during the COVID-19 crisis compared to those that exited later or not yet at all.

Figure 8: Year-fixed effect estimates for revenue: exit 2021-2022 & retained firms



This figure presents the change in revenue for PE-backed firms exited in 2021 and 2022 and for the remaining PE-backed firms. Specifically, it illustrates the year fixed effects α_t from the equation: $y_{it} = \alpha_i + \alpha_t + \varepsilon_{it}$, where α_t captures year fixed effects, α_i firm fixed effects, and ε_{it} the error term. We use 2019 as the benchmark year and normalize the corresponding coefficient to zero. The equation is estimated separately for PE-backed and control firms. We illustrate the estimates with 95% confidence intervals above and below each point estimates and cluster standard errors at the firm level.

Figure 9: Year-fixed effect estimates for net income: exit 2021-2022 & retained firms



This figure presents the change in net income for PE-backed firms exited in 2021 and 2022 and for the remaining PE-backed firms. Specifically, it illustrates the year fixed effects α_t from the equation: $y_{it} = \alpha_i + \alpha_t + \varepsilon_{it}$, where α_t captures year fixed effects, α_i firm fixed effects, and ε_{it} the error term. We use 2019 as the benchmark year and normalize the corresponding coefficient to zero. The equation is estimated separately for PE-backed and control firms. We illustrate the estimates with 95% confidence intervals above and below each point estimates and cluster standard errors at the firm level.

7.4.2 Results and analysis

Regression results for the financing-related variables presented in Table A.4 (Appendix) show no statistically significant differences between PE-backed firms exited in 2021-2022 and those exited later or not at all yet. This finding aligns with our earlier analysis, where the results on financing metrics remained largely unchanged across the two different samples.

Turning to operating performance, Figures 8 and 9 (both in Section 7.4.1) show significant performance differences between PE-backed companies exited in 2021 and 2022 and those exited later or not at all yet. The earlier exited firms experienced only slight decreases in revenue and net income in 2020, followed by significant growth in 2021. Companies exited later or not at all experienced substantial declines in operating performance in 2020. Table 7 confirms these observations. During the pandemic, firms exited in 2021-2022 significantly outperformed relative to firms retained in PE portfolios across all metrics during the pandemic. Specifically, these firms achieved a relative outperformance of 19.6% in revenue, 32.5% in EBIT, and 30.7% in net income, with all estimates significant at the 1% level.

Overall, these results confirm that firms exited in 2021-2022 demonstrated superior pandemic performance. This pattern also indicates that PE firms divested stronger and more resilient portfolio companies in 2021-2022 while retaining underperformers, likely aiming to implement operational improvements and create value to increase future exit valuations. As the conditions of the exit market were very favorable in 2021 (PitchBook, 2022), PE firms likely wanted to capitalize on the attractive valuations of their better-performing and more resilient firms.

To complete this analysis, we examine the industry and acquisition date distributions of both groups. The industry distribution analysis (Table A.5, Appendix) reveals minimal differences between 2021-2022 exits and retained companies. Similarly, the acquisition date distribution is broadly similar (Figure B.3, Appendix). The only notable difference shows in acquisitions in 2018: 2021-2022 exits include slightly fewer 2018 deals, which is offset by more 2014 acquisitions. These findings show that the outperformance of 2021-2022 exited firms during the pandemic was not related to industry belonging or differences in entry dates but rather reflect firm-specific performance. The fact that PE firms exited better-performing companies while keeping similar-aged firms with weaker performance during the pandemic provides strong evidence that PE firms manage their portfolios opportunistically. This approach allows PE firms to increase returns by timing exits based on market conditions and company-specific performance rather than on a fixed, predetermined investment horizon. This

aligns with previous research from Jenkinson et al. (2022) suggesting that GPs have market timing capabilities, particularly when exiting investments, as they typically have considerable flexibility in deciding when to divest portfolio companies and can strategically sell when market multiples are higher relative to those at the acquisition. Overall, we find strong support for Hypothesis 6, which put forward that PE-backed firms exited during or shortly after the pandemic exhibited superior operating performance compared to those retained in portfolios.

Table 7: Regression results on operating performance metrics - 2021-2022 exits vs remaining PE-backed companies

Variable	Revenue		EBITDA		EBIT		Net Income		ROA	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Baseline DiD Results										
Exit_2021_2022 × During	0.184***	0.196***	0.338***	0.361***	0.31***	0.325***	0.285**	0.307***	0.034***	0.032***
	(0.048)	(0.05)	(0.087)	(0.09)	(0.105)	(0.107)	(0.114)	(0.114)	(0.011)	(0.012)
Panel B: Year-by-Year Effects										
Exit × 2017	-0.003	-0.016	-0.147	-0.15	-0.145	-0.174	-0.102	-0.122	-0.018	-0.018
	(0.052)	(0.053)	(0.124)	(0.127)	(0.112)	(0.114)	(0.127)	(0.131)	(0.019)	(0.019)
Exit × 2018	-0.007	-0.007	-0.085	-0.075	-0.107	-0.119	-0.037	-0.033	-0.029*	-0.027
	(0.028)	(0.028)	(0.112)	(0.114)	(0.096)	(0.097)	(0.114)	(0.116)	(0.016)	(0.016)
Exit × 2020	0.147***	0.149***	0.294***	0.312***	0.193	0.183	0.19	0.217	0.022*	0.023*
	(0.038)	(0.039)	(0.109)	(0.114)	(0.123)	(0.128)	(0.146)	(0.152)	(0.012)	(0.012)
Exit × 2021	0.221***	0.232***	0.238**	0.26**	0.281**	0.287***	0.301**	0.314**	0.02	0.015
	(0.049)	(0.051)	(0.113)	(0.117)	(0.11)	(0.109)	(0.144)	(0.138)	(0.014)	(0.014)
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Controls	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
N	3242	3046	2609	2460	2267	2133	2107	1985	2637	2486

This table presents the comparison between PE-backed firms that were exited in 2021-2022 and those that remained in PE portfolios longer, with a focus on their operating performance metrics during the COVID-19 pandemic. Panel A reports results for our baseline Difference-in-Differences model (Equation 1), where Exit_2021_2022 is a dummy variable equal to one for PE-backed firms that were exited in 2021-2022 and zero for PE-backed firms that remained in portfolios longer. "During" is a time dummy that equals one for the pandemic period (2020-2021) and zero otherwise. Panel B displays estimates from our dynamic model (Equation 3), with 2019 being the reference year. Dependent variables include Total Assets, Total Debt, Debt Issuance, Leverage, Cost of Debt, and Equity Injection. All specifications include year and firm fixed effects. Even-numbered columns consider control variables (firm size, cash holdings scaled by assets, sales growth, leverage, and return on assets) measured in 2019 and interacted with time dummies. We cluster standard errors (in parentheses) at the firm level. Statistical significance is denoted by *** for the 1% level, ** for the 5% level, and * for the 10% level.

7.5 Robustness check

Our robustness analysis focuses primarily on the findings presented in Sections 7.1 and 7.2, which relate to the originally constructed sample.

In the first robustness check, we address concerns raised by Bernstein et al. (2019) regarding the use of leverage in the matching process. Since PE-backed firms typically have higher leverage than the average unsponsored counterpart, matching on this variable may result in a control group not representative of the broader population of unsponsored firms. To address this potential selection bias, we follow Bernstein et al. (2019) and construct an alternative control group by matching firms based solely on size and profitability in 2019. As Bernstein et al. (2019) note, this matching approach also offers the advantage that it increases the likelihood of finding matches for firms in the treatment group. For this alternative sample, Tables A.6 and A.7 in the Appendix present the regression results. The estimated coefficients for financing metrics remain unchanged in terms of statistical significance and very similar in terms of economic magnitude to our previously reported estimates. We observe a slight increase in statistical significance for coefficients on equity injection during the pandemic period, as discussed in Section 7.1.3. Further, our findings on operating performance metrics remain similar with regard to statistical significance and economic magnitude. Overall, this suggests that our findings are robust and not driven by sample selection biases related to differences in pre-pandemic leverage between PE-backed and control firms.

Following Bernstein et al. (2019), we conduct a second robustness check using a control group matched in 2018 instead of 2019 but with our original criteria of size, profitability, and leverage with 30% bandwidths. This approach tests whether results are sensitive to the matching year. In addition, since many of our treatment companies were acquired in 2017-2018, this approach helps us to offset early effects of PE ownership, which might be included in financial data as of 2019. The results, presented in Tables A.8 and A.9 in the Appendix, remain relatively unchanged compared to our main findings. For financing metrics, the only notable differences are the loss of statistical significance for debt issuance during the pandemic and equity issuance post-pandemic. For operating performance metrics, the underperformance trend of PE-backed firms becomes slightly more pronounced in terms of economic magnitude and statistical significance.

7.6 Limitations

This section presents three important limitations of our study that should be considered when interpreting our findings.

First, our analysis is limited to firms with sufficient financial data. This especially affects companies classified as “small” on Companies House, which we exclude due to their limited reporting requirements and hence restricted availability of financial data. This process reduces our sample size and may introduce a selection bias, as our analysis is based on companies large enough to be subject to the full reporting requirements. In addition, our matching success rate of 43.31% suggests that our sample may be biased toward more "matchable" PE-backed firms, namely those companies with characteristics that make them more similar to non-PE-backed firms. For those reasons, our results may not be fully generalizable to the whole population of PE-backed companies in the UK.

Second, our analysis faces limitations in fully satisfying the parallel trends assumption for debt-related metrics. This assumption is fundamental to the validity of our Difference-in-Differences approach. PE investment decisions often rely on unobservable characteristics, such as management quality and growth potential, that historical financial data cannot fully capture. This information asymmetry makes the construction of a perfectly comparable control group inherently challenging. While our pre-pandemic analysis shows reasonable parallel trends for key financial variables, the assumption may not fully hold across all variables. Notably, we observe a statistically significant difference in the two-year pre-pandemic debt growth rate, with PE-backed firms exhibiting a higher growth rate than control firms. As noted in Section 7.1.1, this deviation affects our interpretation of debt-related findings and, consequently, represents a limitation of the DiD approach when applied to outcome variables that do not fully satisfy the parallel trends assumption.

Third, our conclusion that PE-backed firms operate with higher operating leverage (greater fixed costs relative to variable costs) is based on an indirect analysis rather than direct cost structure analysis. Specifically, we observe that PE-backed firms experienced significantly larger declines in profitability metrics relative to their revenue declines during the pandemic, and we rule out a competing explanation such as acquisition timing effects. However, due to limited data availability, we cannot directly analyze the underlying cost structures that would provide definitive evidence for this conclusion. Hence, our interpretation remains inferential.

8 Conclusion

This study examines the impact of PE ownership on UK firms during and after the COVID-19 pandemic. By analyzing firms under PE ownership from 2019-2022, we reveal insights into both benefits and challenges associated with PE backing during crises. Our findings indicate that, on average, PE-backed firms had better access to capital throughout both the pandemic and post-pandemic period. Relative to industry peers, these firms exhibited a significant rise in debt levels and a modest increase in equity injections. Notably, despite rising leverage ratios, PE-backed firms did not experience a relative increase in borrowing costs, likely benefiting from their sponsors' good relationships with lenders. Contrary to our expectations, PE-backed firms, on average, did not outperform industry peers in operating performance metrics during the pandemic. Depending on sample selection criteria, we can even observe an operating underperformance during the pandemic. Additionally, our research suggests that PE firms appear to implement higher operating leverage in their portfolio companies, making them more vulnerable to revenue shocks. Finally, our analysis also reveals that PE firms divested better-performing companies in 2021-2022 while retaining underperforming firms, possibly for additional operational improvements.

Our research contributes to the literature on private equity in times of crises in several ways. First, we challenge the common belief that PE ownership enhances operating performance during crises relative to industry peers. Our findings suggest that the cost structures implemented by PE firms may actually increase the vulnerability of their portfolio companies to revenue shocks. Second, our study provides new insights into the post-pandemic period, showing that PE-backed firms capitalized on growth initiatives, as demonstrated by relative increases in revenue and assets during this period. Third, we present renewed evidence that PE-backed firms enjoy better access to capital during economic crises. Finally, and perhaps most notably, our analysis reveals a previously undocumented pattern in PE exit behavior during and shortly after the crisis period, with PE firms strategically divesting better-performing companies. This finding provides important insights into how PE firms manage their portfolios and suggests that, with regard to exit timing, PE firms tend to act opportunistically.

Our findings provide various opportunities for future research. Researchers could investigate whether and how the retained underperforming companies recover under PE ownership and how their long-term performance compares to that of companies exited in 2021-2022. Further, future studies could examine how PE ownership affects operating leverage and

cost structures in portfolio companies and whether PE firms made any changes to this approach as a result of the crisis. Finally, a survey of PE managers now post-pandemic could provide insights into how the pandemic has impacted their investment strategies, capital structure decisions, and value creation approaches in the long term, potentially revealing changes in PE firm approaches as a result of the pandemic.

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Appendix

Table A.1: Regression results on operating performance metrics – controlling for holding period at onset of the pandemic

Variable	Revenue		EBITDA		EBIT		Net Income		ROA	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Baseline DiD Results										
PE × During	-0.038	-0.044	-0.174**	-0.201**	-0.134	-0.113	-0.128	-0.132	-0.037***	-0.036***
	(0.051)	(0.052)	(0.077)	(0.079)	(0.088)	(0.09)	(0.092)	(0.099)	(0.008)	(0.008)
PE × After	0.033	0.031	-0.096	-0.108	-0.093	-0.068	-0.058	-0.013	-0.033***	-0.029***
	(0.043)	(0.045)	(0.074)	(0.072)	(0.09)	(0.09)	(0.095)	(0.093)	(0.008)	(0.008)
Panel B: Year-by-Year Effects										
PE × 2018	-0.018	-0.024	0.075	0.066	0.106	0.112	0.139*	0.161*	0.001	-0.004
	(0.026)	(0.026)	(0.075)	(0.075)	(0.075)	(0.072)	(0.084)	(0.083)	(0.008)	(0.008)
PE × 2020	-0.027	-0.016	-0.118	-0.081	-0.192*	-0.132	-0.091	-0.069	-0.037***	-0.035***
	(0.041)	(0.044)	(0.097)	(0.101)	(0.112)	(0.113)	(0.126)	(0.133)	(0.008)	(0.008)
PE × 2021	-0.016	-0.028	-0.073	-0.078	0.059	0.074	0.004	0.009	-0.028***	-0.033***
	(0.059)	(0.063)	(0.095)	(0.1)	(0.094)	(0.096)	(0.107)	(0.111)	(0.009)	(0.01)
PE × 2022	0.016	0.009	-0.088	-0.07	-0.112	-0.073	-0.091	-0.048	-0.033***	-0.034***
	(0.036)	(0.038)	(0.09)	(0.091)	(0.099)	(0.1)	(0.117)	(0.118)	(0.009)	(0.009)
PE × 2023	0.094**	0.088*	0.068	0.075	0.096	0.123	0.187	0.196	-0.022**	-0.024**
	(0.048)	(0.051)	(0.096)	(0.097)	(0.117)	(0.12)	(0.13)	(0.135)	(0.01)	(0.011)
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Controls	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
N	4885	4497	4230	3966	4388	3972	4522	3929	4938	4284

This table presents the impact of PE ownership on operating performance metrics during and after the COVID-19 pandemic, controlling for the holding period at the onset of the pandemic. Panel A reports results for our baseline Difference-in-Differences model (Equation 1), where PE is a dummy variable equal to one for PE-backed firms and zero for control firms. "During" is a time dummy that equals one for the pandemic period (2020-2021) and zero otherwise, while "After" equals one for the post-pandemic period (2022-2023) and zero otherwise. Panel B displays estimates from our dynamic model (Equation 3), with 2019 being the reference year. Dependent variables include Revenue, EBITDA, EBIT, Net Income, and Return on Asset. All specifications include year and firm fixed effects. Even-numbered columns consider control variables (holding period at onset of pandemic, firm size, cash holdings scaled by assets, sales growth, leverage, and return on assets) measured in 2019 and interacted with time dummies. We cluster standard errors (in parentheses) at the firm level. Statistical significance is denoted by *** for the 1% level, ** for the 5% level, and * for the 10% level.

Table A.2: Regression results on financing metrics - extended sample with 2019 deals and 2021-2022 exits

Variable	Total Assets		Total Debt		Debt Issuance		Leverage		Cost of Debt		Equity Issuance	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Baseline DiD Results												
PE × During	0.136***	0.114***	0.367***	0.33***	0.015*	0.016**	0.032***	0.03***	-0.003	-0.003	0.013**	0.013*
	(0.027)	(0.028)	(0.074)	(0.078)	(0.008)	(0.008)	(0.01)	(0.011)	(0.008)	(0.008)	(0.007)	(0.007)
PE × After	0.211***	0.172***	0.643***	0.584***	0.004	0.006	0.05***	0.048***	-0.015	-0.013	0.014*	0.015*
	(0.04)	(0.041)	(0.11)	(0.115)	(0.009)	(0.01)	(0.014)	(0.015)	(0.01)	(0.011)	(0.008)	(0.008)
Panel B: Year-by-Year Effects												
PE × 2018	-0.027	-0.033	-0.145*	-0.124	-0.001	-0.001	-0.009	-0.006	0.004	0.002	0.002	-0.001
	(0.022)	(0.022)	(0.085)	(0.089)	(0.014)	(0.015)	(0.01)	(0.011)	(0.01)	(0.011)	(0.01)	(0.01)
PE × 2020	0.096***	0.088***	0.194***	0.174***	0.012	0.008	0.016**	0.012	0.007	0.007	0.011	0.009
	(0.021)	(0.023)	(0.06)	(0.064)	(0.013)	(0.014)	(0.008)	(0.009)	(0.008)	(0.009)	(0.008)	(0.009)
PE × 2021	0.126***	0.105***	0.361***	0.366***	0.015	0.021	0.037***	0.039***	-0.005	-0.01	0.013	0.01
	(0.028)	(0.031)	(0.083)	(0.089)	(0.014)	(0.014)	(0.011)	(0.011)	(0.008)	(0.009)	(0.009)	(0.01)
PE × 2022	0.136***	0.114***	0.498***	0.478***	-0.003	-0.001	0.042***	0.043***	-0.015*	-0.015*	0.012	0.011
	(0.036)	(0.038)	(0.097)	(0.104)	(0.013)	(0.014)	(0.013)	(0.014)	(0.008)	(0.009)	(0.009)	(0.01)
PE × 2023	0.248***	0.215***	0.62***	0.591***	0.01	0.013	0.046***	0.046***	-0.007	-0.007	0.012	0.005
	(0.043)	(0.046)	(0.122)	(0.132)	(0.014)	(0.015)	(0.016)	(0.018)	(0.013)	(0.015)	(0.011)	(0.011)
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Controls	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
N	8474	7149	7163	6125	8022	6800	8473	7148	5432	4749	7778	6710

This table presents the impact of PE ownership on firm financing metrics during and after the COVID-19 pandemic for our extended sample. Panel A reports results for our baseline Difference-in-Differences model (Equation 1), where PE is a dummy variable equal to one for PE-backed firms and zero for control firms. "During" is a time dummy that equals one for the pandemic period (2020-2021) and zero otherwise, while "After" equals one for the post-pandemic period (2022-2023) and zero otherwise. Panel B displays estimates from our dynamic model (Equation 3), with 2019 being the reference year. Dependent variables include Total Assets, Total Debt, Debt Issuance, Leverage, Cost of Debt, and Equity Issuance. All specifications include year and firm fixed effects. Even-numbered columns consider control variables (firm size, cash holdings scaled by assets, sales growth, leverage, and return on assets) measured in 2019 and interacted with time dummies. We cluster standard errors (in parentheses) at the firm level. Statistical significance is denoted by *** for the 1% level, ** for the 5% level, and * for the 10% level.

Table A.3: Descriptive statistics - PE-backed companies comparison: early exited firms (2021-2022) vs late or non-exited firms

	Early Exits				Late or Non-Exits			Difference
Variable	**N**	**Mean**	**Median**	**SD**	**N**	**Mean**	**Median**	**SD**	**Mean**
Assets (£000)	179	173,771.31	28,367.00	679,671.14	452	162,750.21	27,298.00	564,261.31	11021.1
Revenue (£000)	179	98,460.66	26,360.00	357,077.89	452	117,785.49	25,680.00	781,771.44	-19324.82
EBIT (£000)	179	8,351.39	1,229.00	55,011.10	452	5,064.24	1,056.00	28,929.58	3287.14
ROA	171	0.06	0.06	0.15	431	0.03	0.04	0.15	0.02*
Debt (£000)	179	61,128.87	7,912.00	185,186.28	452	79,776.61	5,286.00	297,166.89	-18647.74
Equity financing/assets	171	-0.03	0.00	0.11	431	-0.02	0.00	0.09	-0.01
Debt issuance/assets	171	0.08	0.02	0.22	431	0.06	0.02	0.22	0.02

This table presents summary statistics of financial data for the pre-pandemic year (2019) for PE-backed companies exited in 2021-2022 and for PE-backed companies exited in 2023 or later or not exited yet. The "Early Exits" columns show data for PE-backed companies in our sample exited in 2021-2022. The "Late or Non-Exits" columns represent PE-backed firms in our sample exited in 2023 or later or not exited yet. For each group, we report the number of observations (N), mean, median, and standard deviation (SD) of key financial metrics. The "Difference" column displays the mean difference between PE-backed and control firms. All financial ratios are winsorized at the 2% level to mitigate the influence of outliers. Statistical significance of differences is indicated as follows: *** for the 1% level, ** for the 5% level, and * for the 10% level.

Table A.4: Regression results on financing metrics - 2021-2022 exits vs remaining PE-backed companies

Variable	Total Assets		Total Debt		Debt Issuance		Leverage		Cost of Debt		Equity Injection	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Baseline DiD Results												
Exit_2021_2022 × During	0.076**	0.085**	-0.03	0.008	-0.143	-0.137	-0.121	-0.096	0.127	0.147	0.013	0.014
	(0.037)	(0.038)	(0.106)	(0.109)	(0.181)	(0.184)	(0.104)	(0.108)	(0.138)	(0.143)	(0.01)	(0.01)
Panel B: Year-by-Year Effects												
Exit × 2017	0.014	-0.007	-0.077	-0.119	0.141	0.124	-0.072	-0.089	0.064	0.068	-0.001	0
	(0.042)	(0.043)	(0.147)	(0.151)	(0.296)	(0.306)	(0.133)	(0.138)	(0.198)	(0.203)	(0.022)	(0.022)
Exit × 2018	-0.046*	-0.036	-0.09	-0.083	0.125	0.122	-0.041	-0.043	-0.216	-0.24	-0.013	-0.012
	(0.025)	(0.024)	(0.12)	(0.123)	(0.247)	(0.256)	(0.112)	(0.115)	(0.191)	(0.193)	(0.011)	(0.011)
Exit × 2020	0.063**	0.071***	-0.141	-0.099	-0.182	-0.179	-0.191**	-0.158*	0.217	0.207	0.016	0.02*
	(0.026)	(0.027)	(0.09)	(0.089)	(0.222)	(0.224)	(0.086)	(0.087)	(0.15)	(0.155)	(0.011)	(0.012)
Exit × 2021	0.096**	0.098**	-0.095	-0.084	0.036	0.034	-0.184	-0.178	-0.121	-0.072	0.008	0.008
	(0.038)	(0.039)	(0.118)	(0.122)	(0.258)	(0.266)	(0.117)	(0.123)	(0.173)	(0.171)	(0.015)	(0.015)
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Controls	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
N	3298	3077	3013	2803	1572	1464	3013	2803	2420	2251	2637	2486

This table presents the comparison between PE-backed firms that were exited in 2021-2022 and those that remained in PE portfolios longer, with a focus on their financing metrics during the COVID-19 pandemic. Panel A reports results for our baseline Difference-in-Differences model (Equation 1), where Exit_2021_2022 is a dummy variable equal to one for PE-backed firms that were exited in 2021-2022 and zero for PE-backed firms that remained in portfolios longer. "During" is a time dummy that equals one for the pandemic period (2020-2021) and zero otherwise. Panel B displays estimates from our dynamic model (Equation 3), with 2019 being the reference year. Dependent variables include Total Assets, Total Debt, Debt Issuance, Leverage, Cost of Debt, and Equity Injection. All specifications include year and firm fixed effects. Even-numbered columns consider control variables (firm size, cash holdings scaled by assets, sales growth, leverage, and return on assets) measured in 2019 and interacted with time dummies. We cluster standard errors (in parentheses) at the firm level. Statistical significance is denoted by *** for the 1% level, ** for the 5% level, and * for the 10% level.

Table A.5: Industry distribution - exits 2021-2022 vs remaining PE-backed companies

Industry name	Later or not exited (%)	Early Exited (%)
Accommodation and food service	3.79	5.62
Construction	4.68	2.81
Information and communication	14.48	15.17
Manufacturing	18.71	19.66
Mining	0.89	0.56
Retail trade	3.79	5.62
Services	39.64	42.13
Transporting and storage	4.90	1.12
Utilities	2.23	1.69
Wholesale trade	6.90	5.62

This table presents the industry distribution of PE-backed companies exited in 2021-2022 and the distribution of PE-backed companies exited in 2023 or later or not exited yet in our sample (acquired between 2013 and 2018). The "Industry name" column provides the corresponding sector descriptions. The "Later or not exited (%)" column shows the percentage distribution across industries for PE-backed firms that either exited in 2023 or later or had not yet exited. The "Early Exited (%)" column displays the percentage distribution across industries for PE-backed companies that exited in 2021-202

Table A.6: Robustness check - regression results on financing metrics - size and profitability matching criteria

Variable	Total Assets		Total Debt		Debt Issuance		Leverage		Cost of Debt		Equity Issuance	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Baseline DiD Results												
PE × During	0.124***	0.071**	0.375***	0.296***	0.016**	0.017**	0.037***	0.032***	-0.015	-0.013	0.015**	0.013*
	(0.031)	(0.031)	(0.088)	(0.091)	(0.008)	(0.008)	(0.01)	(0.011)	(0.011)	(0.012)	(0.007)	(0.007)
PE × After	0.182***	0.13***	0.538***	0.491***	-0.007	0	0.052***	0.053***	-0.01	-0.011	0.014*	0.012
	(0.041)	(0.041)	(0.113)	(0.117)	(0.008)	(0.008)	(0.013)	(0.014)	(0.013)	(0.014)	(0.007)	(0.008)
Panel B: Year-by-Year Effects												
PE × 2018	-0.027	-0.031	-0.111	-0.135	0.018	0.013	-0.001	-0.004	0.009	0.009	-0.018*	-0.018*
	(0.019)	(0.02)	(0.104)	(0.106)	(0.017)	(0.018)	(0.012)	(0.012)	(0.017)	(0.018)	(0.01)	(0.011)
PE × 2020	0.095***	0.057**	0.158*	0.051	0.015	0.007	0.013	0.006	-0.004	0.004	0.003	0
	(0.026)	(0.024)	(0.09)	(0.087)	(0.016)	(0.016)	(0.009)	(0.009)	(0.014)	(0.014)	(0.008)	(0.009)
PE × 2021	0.129***	0.083***	0.364***	0.333***	0.032**	0.035**	0.047***	0.043***	-0.006	-0.01	0.004	0.004
	(0.032)	(0.031)	(0.101)	(0.1)	(0.016)	(0.016)	(0.011)	(0.012)	(0.015)	(0.016)	(0.009)	(0.009)
PE × 2022	0.139***	0.089**	0.36***	0.312***	-0.005	-0.005	0.048***	0.042***	0.002	0.002	0	-0.003
	(0.036)	(0.036)	(0.11)	(0.112)	(0.014)	(0.015)	(0.013)	(0.013)	(0.014)	(0.015)	(0.009)	(0.01)
PE × 2023	0.21***	0.16***	0.511***	0.429***	0.008	0.014	0.043***	0.04**	-0.004	-0.006	0.005	0.003
	(0.044)	(0.046)	(0.133)	(0.135)	(0.015)	(0.015)	(0.016)	(0.017)	(0.018)	(0.019)	(0.01)	(0.011)
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Controls	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
N	9658	8151	8142	6967	9132	7718	9658	8151	6137	5402	8873	7609

This table presents the impact of PE ownership on firm financing metrics during and after the COVID-19 pandemic, without leverage as matching criterion. Panel A reports results for our baseline Difference-in-Differences model (Equation 1), where PE is a dummy variable equal to one for PE-backed firms and zero for control firms. "During" is a time dummy that equals one for the pandemic period (2020-2021) and zero otherwise, while "After" equals one for the post-pandemic period (2022-2023) and zero otherwise. Panel B displays estimates from our dynamic model (Equation 3), with 2019 being the reference year. Dependent variables include Revenue, EBITDA, EBIT, Net Income, and Return on Asset. All specifications include year and firm fixed effects. Even-numbered columns consider control variables (firm size, cash holdings scaled by assets, sales growth, leverage, and return on assets) measured in 2019 and interacted with time dummies. We cluster standard errors (in parentheses) at the firm level. Statistical significance is denoted by *** for the 1% level, ** for the 5% level, and * for the 10% level.

Table A.7: Robustness check - regression results on operating performance metrics - size and profitability matching criteria

Variable	Revenue		EBITDA		EBIT		Net Income		ROA	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Baseline DiD Results										
PE × During	-0.021	-0.052	-0.141**	-0.145**	-0.086	-0.062	-0.092	-0.068	-0.037***	-0.036***
	(0.045)	(0.047)	(0.063)	(0.066)	(0.075)	(0.078)	(0.077)	(0.083)	(0.007)	(0.007)
PE × After	0.037	0.029	-0.092	-0.09	-0.089	-0.099	-0.092	-0.07	-0.029***	-0.028***
	(0.036)	(0.04)	(0.062)	(0.063)	(0.074)	(0.075)	(0.081)	(0.079)	(0.007)	(0.007)
Panel B: Year-by-Year Effects										
PE × 2018	-0.014	-0.026	0.033	0.041	0.057	0.088	0.109	0.156**	0.003	0.003
	(0.023)	(0.023)	(0.058)	(0.059)	(0.061)	(0.059)	(0.069)	(0.069)	(0.007)	(0.007)
PE × 2020	-0.009	-0.027	-0.105	-0.08	-0.096	-0.056	0.022	0.048	-0.032***	-0.031***
	(0.038)	(0.039)	(0.079)	(0.082)	(0.097)	(0.099)	(0.103)	(0.108)	(0.007)	(0.007)
PE × 2021	0.022	-0.007	-0.085	-0.082	0.023	0.071	-0.003	0.049	-0.028***	-0.03***
	(0.052)	(0.055)	(0.077)	(0.082)	(0.081)	(0.083)	(0.092)	(0.097)	(0.008)	(0.008)
PE × 2022	0.06*	0.038	-0.099	-0.081	-0.084	-0.076	-0.063	-0.046	-0.028***	-0.029***
	(0.034)	(0.036)	(0.076)	(0.076)	(0.081)	(0.083)	(0.1)	(0.101)	(0.008)	(0.008)
PE × 2023	0.067*	0.05	0.018	0.037	0.023	0.046	0.096	0.132	-0.015*	-0.015*
	(0.038)	(0.039)	(0.075)	(0.078)	(0.095)	(0.098)	(0.113)	(0.11)	(0.008)	(0.009)
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Controls	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
N	8750	8002	7434	6928	7812	7025	8061	6947	8873	7609

This table presents the impact of PE ownership on operating performance metrics during and after the COVID-19 pandemic, in a sample without leverage as matching criterion for the control group. Panel A reports results for our baseline Difference-in-Differences model (Equation 1), where PE is a dummy variable equal to one for PE-backed firms and zero for control firms. "During" is a time dummy that equals one for the pandemic period (2020-2021) and zero otherwise, while "After" equals one for the post-pandemic period (2022-2023) and zero otherwise. Panel B displays estimates from our dynamic model (Equation 3), with 2019 being the reference year. Dependent variables include Revenue, EBITDA, EBIT, Net Income, and Return on Asset. All specifications include year and firm fixed effects. Even-numbered columns consider control variables (firm size, cash holdings scaled by assets, sales growth, leverage, and return on assets) measured in 2019 and interacted with time dummies. We cluster standard errors (in parentheses) at the firm level. Statistical significance is denoted by *** for the 1% level, ** for the 5% level, and * for the 10% level.

Table A.8: Robustness check - regression results on financing metrics - matching in 2018

Variable	Total Assets		Total Debt		Debt Issuance		Leverage		Cost of Debt		Equity Issuance	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Baseline DiD Results												
PE × During	0.106***	0.053	0.257***	0.216**	0.016	0.011	0.041***	0.044***	0.001	0.001	0.015*	0.013
	(0.037)	(0.038)	(0.094)	(0.097)	(0.01)	(0.01)	(0.011)	(0.012)	(0.011)	(0.011)	(0.009)	(0.009)
PE × After	0.194***	0.104**	0.529***	0.441***	0.01	0.01	0.066***	0.069***	0.007	0.003	0.013	0.01
	(0.051)	(0.05)	(0.122)	(0.126)	(0.011)	(0.01)	(0.016)	(0.016)	(0.013)	(0.014)	(0.009)	(0.009)
Panel B: Year-by-Year Effects												
PE × 2018	-0.061**	-0.048*	-0.074	-0.042	-0.002	0	0.004	0.007	-0.007	-0.009	-0.026**	-0.024*
	(0.025)	(0.026)	(0.107)	(0.11)	(0.019)	(0.019)	(0.012)	(0.013)	(0.014)	(0.015)	(0.013)	(0.013)
PE × 2020	0.042	0.034	0.015	0.018	0.009	0.011	0.015	0.019*	0.01	0.01	-0.001	-0.004
	(0.031)	(0.033)	(0.094)	(0.098)	(0.018)	(0.018)	(0.01)	(0.01)	(0.014)	(0.014)	(0.011)	(0.011)
PE × 2021	0.081**	0.054	0.305***	0.304***	0.024	0.027	0.057***	0.06***	-0.013	-0.014	-0.008	-0.007
	(0.04)	(0.04)	(0.104)	(0.107)	(0.019)	(0.02)	(0.015)	(0.015)	(0.014)	(0.014)	(0.011)	(0.011)
PE × 2022	0.11**	0.054	0.4***	0.395***	0.002	0.007	0.059***	0.066***	-0.004	-0.006	-0.005	-0.009
	(0.046)	(0.042)	(0.123)	(0.128)	(0.017)	(0.017)	(0.017)	(0.017)	(0.014)	(0.015)	(0.011)	(0.011)
PE × 2023	0.201***	0.171***	0.481***	0.474***	0.021	0.025	0.063***	0.066***	0.016	0.013	-0.009	-0.008
	(0.056)	(0.057)	(0.141)	(0.145)	(0.018)	(0.018)	(0.019)	(0.019)	(0.021)	(0.021)	(0.013)	(0.013)
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Controls	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
N	5280	4845	4496	4136	5014	4603	5280	4845	3494	3253	4911	4523

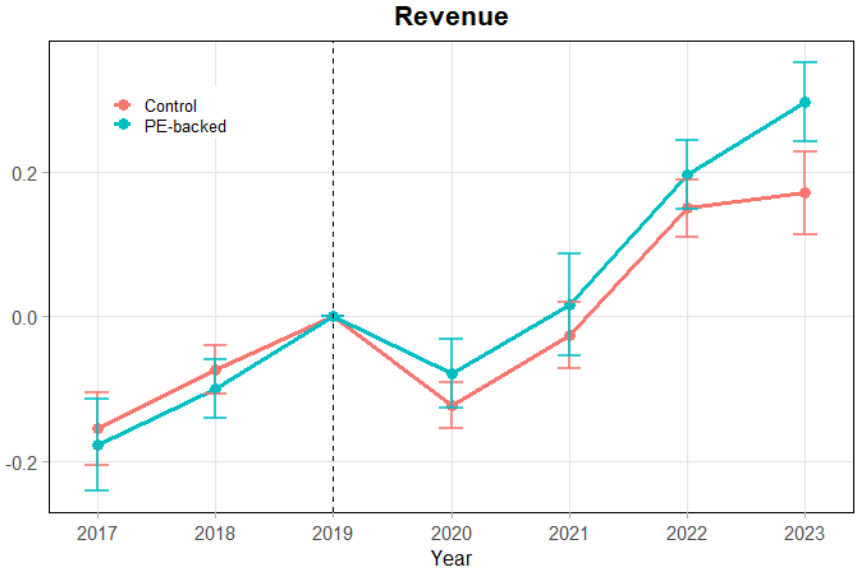
This table presents the impact of PE ownership on firm financing metrics during and after the COVID-19 pandemic, with matching for the control group done in 2018. Panel A reports results for our baseline Difference-in-Differences model (Equation 1), where PE is a dummy variable equal to one for PE-backed firms and zero for control firms. "During" is a time dummy that equals one for the pandemic period (2020-2021) and zero otherwise, while "After" equals one for the post-pandemic period (2022-2023) and zero otherwise. Panel B displays estimates from our dynamic model (Equation 3), with 2019 being the reference year. Dependent variables include Revenue, EBITDA, EBIT, Net Income, and Return on Asset. All specifications include year and firm fixed effects. Even-numbered columns consider control variables (firm size, cash holdings scaled by assets, sales growth, leverage, and return on assets) measured in 2019 and interacted with time dummies. We cluster standard errors (in parentheses) at the firm level. Statistical significance is denoted by *** for the 1% level, ** for the 5% level, and * for the 10% level.

Table A.9: Robustness check - regression results on operating performance metrics - matching in 2018

Variable	Revenue		EBITDA		EBIT		Net Income		ROA	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Baseline DiD Results										
PE × During	-0.106**	-0.139***	-0.242***	-0.262***	-0.212**	-0.242***	-0.229**	-0.265***	-0.055***	-0.056***
	(0.051)	(0.052)	(0.077)	(0.079)	(0.089)	(0.093)	(0.097)	(0.101)	(0.009)	(0.009)
PE × After	0.022	-0.028	-0.179**	-0.171**	-0.141	-0.156*	-0.097	-0.132	-0.042***	-0.038***
	(0.048)	(0.047)	(0.073)	(0.074)	(0.091)	(0.092)	(0.094)	(0.094)	(0.008)	(0.008)
Panel B: Year-by-Year Effects										
PE × 2018	-0.074***	-0.081***	0.019	0.02	-0.044	-0.044	-0.044	-0.056	0.01	0.013*
	(0.026)	(0.025)	(0.077)	(0.078)	(0.073)	(0.074)	(0.08)	(0.081)	(0.007)	(0.007)
PE × 2020	-0.11**	-0.1**	-0.199*	-0.177*	-0.243**	-0.245**	-0.234*	-0.245*	-0.038***	-0.038***
	(0.045)	(0.046)	(0.106)	(0.107)	(0.117)	(0.119)	(0.141)	(0.143)	(0.009)	(0.009)
PE × 2021	-0.145**	-0.141**	-0.171	-0.175	-0.128	-0.133	-0.11	-0.126	-0.032***	-0.032***
	(0.061)	(0.063)	(0.105)	(0.107)	(0.099)	(0.102)	(0.115)	(0.117)	(0.01)	(0.01)
PE × 2022	-0.045	-0.045	-0.196**	-0.185*	-0.168	-0.162	-0.087	-0.106	-0.026***	-0.024**
	(0.038)	(0.039)	(0.096)	(0.097)	(0.105)	(0.106)	(0.117)	(0.118)	(0.01)	(0.01)
PE × 2023	0.057	0.059	-0.03	-0.02	-0.044	-0.027	0.022	0.008	-0.017	-0.012
	(0.055)	(0.056)	(0.097)	(0.097)	(0.119)	(0.117)	(0.131)	(0.133)	(0.01)	(0.011)
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Controls	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
N	4945	4737	4320	4193	4364	4169	4468	4152	4911	4523

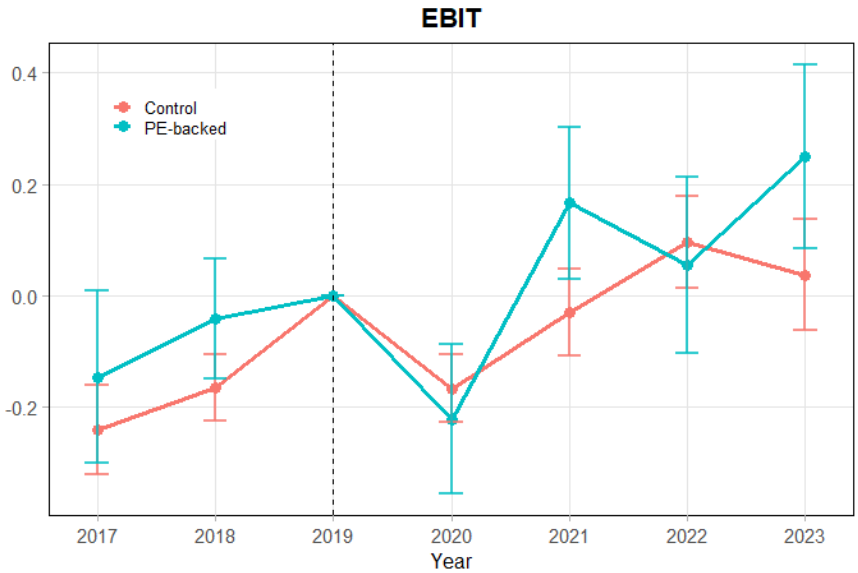
This table presents the impact of PE ownership on operating performance metrics during and after the COVID-19 pandemic, in a sample with the matching for the control group done in 2018. Panel A reports results for our baseline Difference-in-Differences model (Equation 1), where PE is a dummy variable equal to one for PE-backed firms and zero for control firms. "During" is a time dummy that equals one for the pandemic period (2020-2021) and zero otherwise, while "After" equals one for the post-pandemic period (2022-2023) and zero otherwise. Panel B displays estimates from our dynamic model (Equation 3), with 2019 being the reference year. Dependent variables include Revenue, EBITDA, EBIT, Net Income, and Return on Asset. All specifications include year and firm fixed effects. Even-numbered columns consider control variables (firm size, cash holdings scaled by assets, sales growth, leverage, and return on assets) measured in 2019 and interacted with time dummies. We cluster standard errors (in parentheses) at the firm level. Statistical significance is denoted by *** for the 1% level, ** for the 5% level, and * for the 10% level.

Figure B.1: Year-fixed effect estimates for revenue (2017–2023) - extended dataset



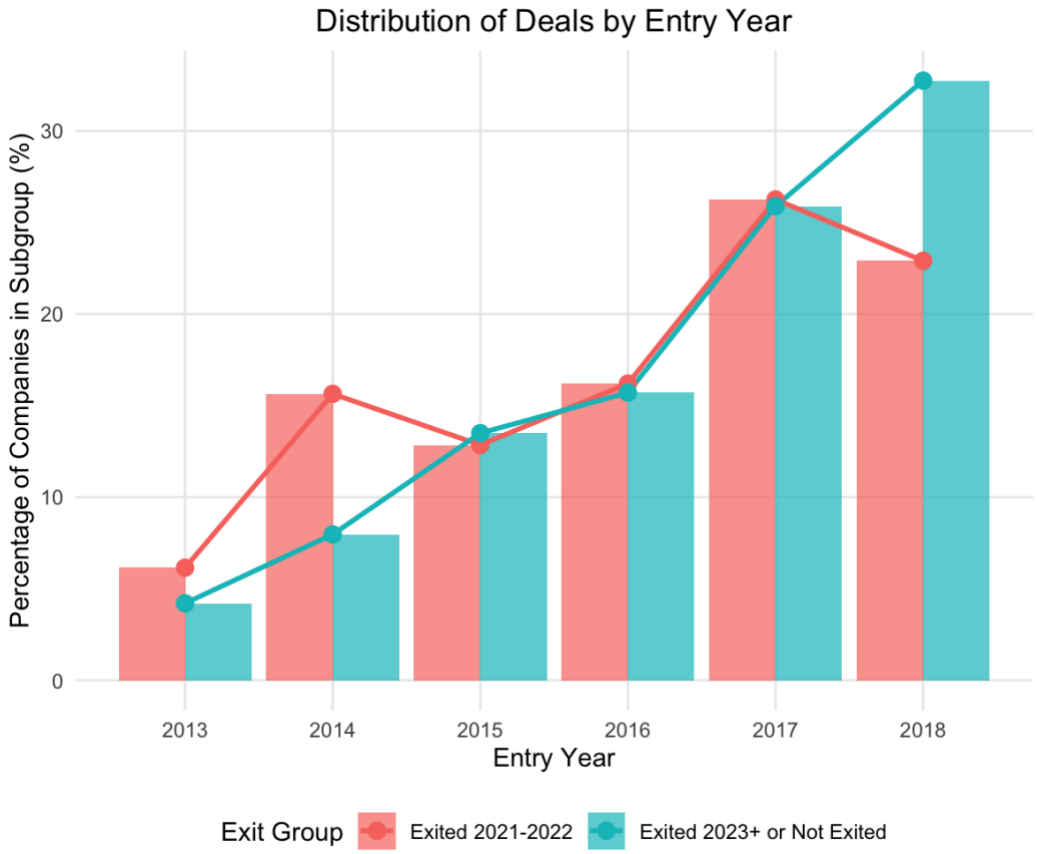
This figure presents the change in revenue for PE-backed firms and control firms in our extended sample. Specifically, it illustrates the year fixed effects α_t from the equation: $y_{it} = \alpha_i + \alpha_t + \varepsilon_{it}$, where α_t captures year fixed effects, α_i firm fixed effects, and ε_{it} the error term. We use 2019 as the benchmark year and normalize the corresponding coefficient to zero. The equation is estimated separately for PE-backed and control firms. We illustrate the estimates with 95% confidence intervals above and below each point estimates and cluster standard errors at the firm level.

Figure B.2: Year-fixed effect estimates for EBIT (2017–2023) - extended dataset



This figure presents the change in EBIT for PE-backed firms and control firms in our extended sample. Specifically, it illustrates the year fixed effects α_t from the equation: $y_{it} = \alpha_i + \alpha_t + \varepsilon_{it}$, where α_t captures year fixed effects, α_i firm fixed effects, and ε_{it} the error term. We use 2019 as the benchmark year and normalize the corresponding coefficient to zero. The equation is estimated separately for PE-backed and control firms. We illustrate the estimates with 95% confidence intervals above and below each point estimates and cluster standard errors at the firm level.

Figure B.3: Distribution of entry dates - exited in 2021-2022 vs 2023+ or not exited



This figure illustrates the distribution of entry years for the PE-backed companies in our sample, split in two groups: Those that exited early (in 2021-2022) are shown in red and those that either exited later (2023+) or not exited yet are shown in blue. The x-axis represents the entry year (2013-2018) when the companies were acquired by private equity firms, while the y-axis shows the percentage of companies within each subgroup.

Formula Overview

$$Average\ Total\ Assets\ (t) = (Total\ Assets\ (t) + Total\ Assets\ (t-1))/2$$

$$Average\ Total\ Debt\ (t) = (Total\ Debt\ (t) + \ Total\ Debt\ (t-1))/2$$

$$Cost\ of\ Debt\ (t) = Interest\ Paid\ (t)\ /\ Average\ Total\ Debt\ (t)$$

$$Debt\ Issuance\ (t) = (Total\ Debt\ (t) - Total\ Debt\ (t-1))\ /\ Average\ Total\ Assets\ (t)$$

$$Equity\ Injections\ (t) = (Total\ Equity\ (t) - Total\ Equity\ (t-1) - Net\ Profit\ (t))/Average\ Total\ Assets\ (t)$$

$$Leverage\ (t) = Total\ Debt\ (t)/Total\ Assets\ (t)$$

$$ROA\ (t) = Net\ Income\ (t)/Average\ Total\ Assets\ (t)$$

Artificial intelligence disclosure

In selective parts for R coding, we used assistance from generative artificial intelligence (generative AI), which was limited to the following technical aspects:

- **Assistance in coding:** Generative AI was used for suggestions to construct data processing scripts in R when handling the extensive financial datasets from Orbis and Pitchbook. This allowed us to be more efficient in analyzing our data and implementing the Difference-in-Differences models and matching techniques described in the methodology.
- **Debugging support**: When we encountered technical challenges with R coding, AI tools provided suggestions that allowed us to identify issues and improve our R code.
- **Quality assurance measures**: We implemented several measures to ensure correctness of output and results.
    - We manually reviewed *all* AI-suggested code before implementing it.
    - We manually cross-checked each step and results when processing financial data, and we ensured that each output and result is reasonable.

In combination with our manual reviewing and cross-checking, we are confident that the use of generative AI allowed us to improve our R code.

The only large language model used was ChatGPT (OpenAI, 2025).